Report on

Standards of Training, Certification and Watchkeeping

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Introduction

1.1 Background

In 1985, a gigantic structure called Ammonia Reactor weighing 600 tonnes, diameter 6 metres, and length more than 50 meters was transported from Haldia to Allahabad through Farrakka Barrage for IFCO Bareli. Since then a lot of ODC cargo has moved through the river but the movement of general cargo like grain, fertilizer, coal, etc. has hardly happened. The mode has huge potential and countries like Bangladesh moves 32% of their cargo by inland water transport. [Raghuram G. 2006].

Today we see the Indian Roads are jam packed. Road accidents are increasing exponentially. More than 50,000 crore rupees is the cost of road transport insurance every year.

The cost of transport of cargo is Rs. 0.96 t / km by road, Rs. 0.5 t / km by rail and Rs. 0.35 t / km by Inland water ways.[Rao and Kumar 1996].

A comparison of cost of Rail movement with Coastal Shipping & Inland Water Transport was carried out by TCS and found the transport cost as Rs.0.30 per t/Km by Coastal & IWT and Rs.0.65 per t/Km by Rail. [TCS: Report on development of Coastal Shipping, 2004].

1.2 Indian Inland Water

India has about 14,500 km of navigable waterways which comprise of rivers, canals, backwaters, creeks, etc. There are five declared National Waterways (NW) and one is proposed awaiting parliament approval to be declared as National Waterway. The NW-1, the Ganga river between Allahabad - Haldia (1620 km), the NW-2 Sadiya-

Dhubri stretch of river Brahmaputra (891 km), the NW-3 Kollam-Kottapuram stretch of West Coast Canal along with Champakara and Udyogmandal Canals (205 km) in Kerala, the NW-4 Godavari & Krishna rivers & Canals between Kakinada and Puducherry and the NW-5 Talcher-Darmra stretch have so far been declared as National Waterways and are being developed for navigation by IWAI. Bill for declaration of the Barak River as National Waterway has already been introduced in the Parliament.

For development and regulation of Inland waterways for shipping and navigation, the Inland Waterways Authority of India (IWAI) came into existence on 27 October 1986. The Authority primarily undertakes projects for development and maintenance of IWT infrastructure on national waterways through grant received from Ministry of Shipping, Road Transport and Highways.

1.3 Trade by Inland vessel current and future

Although India has a long length of Inland Water, but only about 1500 Inland Vessels are operating in transporting cargo. Our competitor in economic growth China has more than 15000 Inland Vessels. In India share of water born transport in domestic freight movements is 6 % whereas in China it is 30 % of total domestic freight traffic. Needless to say China Inland Water Conditions are worst than India.

Nevertheless about 50 million tonnes of cargo corresponding to 2.82 billion tonne km is transported by Inland Water Transport every year. Its operations are currently restricted to a few stretches in the Ganga-Bhagirathi-Hooghly Rivers, the Brahmaputra, the Barak River, the rivers in Goa, the backwaters in Kerala, inland waters in Mumbai, and the deltaic regions of the Godavari-Krishna rivers. Besides the

organised operations by mechanised vessels, country boats of various capacities also operate in various rivers and canals. Data of cargo and passenger movement in unorganised sector (i.e. by country boats, etc.) has not been compiled (for which efforts are on) but it is a fact that substantial quantum of cargo and passengers are transported in the unorganised sector as well.

The Inland waterways have played an important role in the Indian transport system since ancient times. The Inland water transport and River-Sea transport holds a great promise more so because it is the most energy efficient, cheapest and environment friendly mode of transport. But the question is, are we in position to grab this opportunity. Why the Inland Water Transport is not picking up in India? Do we have sufficient infrastructure to efficiently operate the Inland Vessels? Do we have competent human resources to operate the Inland Vessels? Do we have quality facilities to train the Inland Vessel personnel? Do we have an efficient system in place to assess the competence of these people?

Do the coastal states have standard rules for regulating Inland water transport?

These are the some of the questions to be answered to make the Inland water transport more attractive.

The Inland Water Act 1917 empowers the State Governments to legislate their rules for Inland Water Transport with regards to construction, registration, survey, manning, certification, etc. Owing to development of railway network highways and bridges the Inland waterways has been overlooked by the center and as well as the states. The same is evident that very few State Governments have enacted IV rules even though ninety four years have passed since IV Act 1917 was legislated.

Today many Inland Vessels are fitted with latest navigational equipment and communication devices. The Inland Water traffic will increase and more number of Inland Vessels will be operating in days to come. Thus the requirements for the safe operation of the Inland water vessels are much more than what we have in the Inland Vessels Act 1917 as amended and Inland Vessels Rules enacted by some of the states. This indicates that there is an urgent need to revise the existing syllabus for Inland Vessel personnel and make a standard syllabus which can be recommended for State Governments to follow.

With the invent of River-Sea Vessel the link between the Inland hinterland and Coastal shipping, the Inland Vessel COC holders are permitted to work on River Sea Vessels which will be going beyond the Inland water limits i.e. 12 nautical miles parallel to the coast. [DGS order No.6 of 2010]

The standards of training, competence and assessment for serving on the River-Sea Vessels should be little more stringent than Inland vessels because the River Sea Vessels will be operating beyond the Inland Water limits and little moderate than NCV Vessels as the RSVs will be going only 12 miles away from the coast.

In India the manning, examination and certification of inland vessels is governed by chapter III Masters & Engineers of Inland Vessels of IV Act 1917. The act has vested the powers of certification, examination and manning on the state governments. The state Governments make rules under the Inland Vessel act for manning, examination and certification.

Each state has different rules for standards of training, certification and watchkeeping for Inland Vessels. For easy mobility of the trained manpower across states, up gradation from Inland Vessel to River Sea Vessel, and from River Sea Vessel to Near Coastal Voyage vessel will be apt.

1.4 Objectives

The objectives of this dissertation are

a) To make uniform standards of Training, Certification and watchkeeping for IV SECTOR
b) To devise a route to upgrade Officers from Inland Vessels to vessels engaged on near coastal voyages.

1.5 Scope of Survey research:

The scope of this dissertation is limited to the study of existing Acts and Orders from Competent Authorities, on safe operation of Inland Vessels and make uniform rules for training, certification and watchkeeping on Inland Vessels after discussion with the different interests and stakeholders.

The Inland Water industry stake holders namely Deck personnel, Engine personnel, Inland Vessel Owners/operators and Governing bodies were involved in this research survey.

The research survey was carried out in nine states namely **Gujarat, Goa, Karnataka, Kerala, Maharashtra, Bihar, Tamil Nadu, West Bengal and Assam**.

Over 125 individuals took part in this research survey that constituted of Inland Vessel Masters, Engine Drivers, IV Engineers, IV institute Faculties, IWA officers, Port Officers, Maritime Boards, MMD officers and vessel owners/operators.

1.6 Research Methodology:-

For collecting the information about the Inland Vessel personnel's standards of Training, assessment and certification following three survey methods were used.

a) **Survey research method.**

b) **Studies of the existing reports.**

c) **Studies of the Inland Vessel Act and Inland Vessel rules enacted by the State Governments.**

1.6.1 Survey Research Method – Since the competence has hardly been amended since inception, to bring in change at large scale it is required that stake holders become a part effecting the amendments. Thus survey method is most appropriate method of investigation, moreover it is accurate and effective tool for research.

Pilot studies and pre-test: A preliminary study was conducted on a limited scale to formulate and validate the questionnaire required to form the basis of the main research. The pilot study played a very vital role in identifying the various variables involved in the research and to gain knowledge of awareness of the nature of the problems and the nature of the respondents.

Final questionnaires:

Realistic and meaningful questionnaires were prepared for getting information about the existing situation of standards of training, assessment and certification in Inland Water sector.

The questionnaire also intended to get information about standards of training, assessment and certification what the stake holders would like to have in the Inland Water Sector.

1.6.2 Studies of the existing reports – Existing reports from earlier research, seminars, etc. were studied to get information about the existing situations and the recommendations made thereby.

1.6.3 Studies of the Inland Vessel Act and Inland Vessel rules enacted by the State Governments- Studies of the Inland Vessel Act and Inland Vessel Rules enacted by the states namely Kerala and Goa was carried out to get information about the standards of training, assessment and certification of IV personnel in these states.

1.7 Current status of Induction Training

The Induction training in the Inland Water Transport has been in existence since 1960's in the states of Assam, West Bengal and Goa. The training in Assam and Goa is still being imparted but it has been discontinued in West Bengal. Two other states Bihar and Kerala have commenced providing training in the sector recently. Basic training is also being provided in Orissa.

The eligibility criteria, selection process, course curriculum, training facilities, examination, certification and Certificate recognition is different in all the states. [Report on IWT Training]

1.7.1 Eligibility Criteria

The eligibility criteria specified by the training institutions providing training in the IWT sector is different with regards to minimum and maximum age, physical standards, medical standards and educational qualification e.g. the education qualification is 9th pass or studying in 10th in Assam and 10th Pass in National Inland National Institute (NINI) Patna, Bihar. Minimum age for admission for training in Maritime School Britona (MSB) Goa is 18 years, whereas in NINI it is 17.5 years and in Crew Training Centre (CTC) Assam there is no minimum age limit. The medical standards are not specified in most cases except stating physically fit with good eyesight and no colour blindness. The CTC and MSB also specify knowing swimming is required to be eligible. [Report on IWT Training]

Recommendation: The proposed eligibility criteria for induction of new entrants to the Inland Waterways Transport shall be as follows:

Age: More than 16 years and less than 25years

Educational Qualification: 10th Pass (English as one of the subjects)

Medical Standards: As per IMO medical standards

Though knowledge of how to swim is eligibility criteria at CTC and MSB it is felt that swimming may be taught during training and knowledge of swimming may be made compulsory at the final examination and certification after induction training.

1.7.2 Selection Process

The selection process for training at CTC, MSB and Kerala shipping and Inland Navigation Corporation Training Center (KTC) is conducted locally in the respective states and is based on interview selection method except in case of NINI where the

selection process is through all India entrance objective written test, interview and psychological profiling. [Report on IWT Training]

Recommendation: The selection process of the new entrants shall be done through all India centralised entrance test, followed by interview and psychological profiling.

1.7.3 Course and Course Curriculum-

The training is being imparted as day school in MSB and KTC, whereas in case of the CTC and NINI the training is being imparted as fully residential course and includes disciplinary training. The duration of the course at MSB is four (4) months and in other institutes it is six (6) months.

All the institutes do have course curriculum but the syllabus varies to a large extent. The syllabus is not standardised and has not been upgraded to take into account the cargo handling and stowage, ship operations and personal care, communication, ship repair and maintenance and pollution functions.

Though the institutes impart training in first aid, fire fighting, personal survival and safety but the training provided is not complete and does not cover all the elements as specified in STCW convention. [Report on IWT Training]

Recommendation: The induction training shall be of six (6) months duration and be made fully residential to cover all the three aspects of training namely knowledge, skill and attitude. The syllabus shall be competence based and on the lines of STCW Convention which covers the necessary functions as mentioned below:

Deck Department

Function 1 - Navigation including inland Navigation

Function 2 - Cargo handling and stowage

Function 3 - Controlling the operation of the ship and care for persons on board (Including Passengers)

Function 4 - Radio communications

Engine Department

Function 1 - Marine engineering

Function 2 - Electrical, electronic and control engineering

Function 3 - Maintenance and repair

Function 4 - Controlling the operation of the ship and care for persons on board

Basic safety Courses -

Personal survival techniques as set out in table A-VI/1-1 of the STCW Convention.

Fire prevention and fire -fighting as set out in table A-VI/1-2 of the STCW Convention

Elementary first-aid as set out in table A-VI/1-3 of the STCW Convention.

Personal safety and social responsibilities as set out in table A-VI/1-4 of the STCW Convention. [Report on IWT Training]

1.8 Current status of training, assessment & certification –

1.8.1 Current status of Training –

The training in the IWT sector is presently being provided by Maritime School, Britona, Goa (MSB), Crew Training Centre, Guwahati, Assam (CTC), National Inland Navigation Institute, Patna (NINI), and Kerala Shipping and Inland Navigation

Corporation (KSINCO) Navigation Training Centre (KTC), Kochi, Kerala, Crew Training Center, Chandrabani, (Orissa). [Report on IWT Training]

1.8.2 Current status of Assessment & Certification –

The manning, examination and certification of inland vessels is governed by chapter III Masters & Engineers of Inland Vessels of IV Act 1917. The act has vested the powers of certification, examination and manning on the state governments. The state Governments make rules under the Inland Vessel act for manning, examination and certification. The rules are drafted by individual governments, usually without reference to practices in other states. Owing to different characteristics of the Inland Waters and the manpower available the rules drafted by the state Governments differ to a large extent. The rules so drafted have not been revised for a long time. Moreover as per the amendment of the section 31 to the I.V. Act – "A certificate of competency or service and license granted under by any state shall have effect throughout India. [2005 Amendment to IV Act 1917 Section 31]

There is also provision of employment of the IV COC holders to work on River-Sea vessels and based on that service the IV COC holders can upgrade to work on the Coastal Vessels. Even though such provision exist but practically it is very difficult for the IV COC holder to graduate from Inland Vessel stream to Near Coastal Voyage (NCV) stream due to absence of training, examination and certification standards in the Inland Vessel Sector and bridging training between Inland Vessel stream and

NCV stream.

1.9 Training from owners perspectives

The Inland Vessel Owners have mixed reactions with regards to Inland Vessel

personnel training.

Some of the Inland Vessel Owners feel that it will be difficult for the Inland Vessel personnel to attend the preparatory courses and many IV personnel will not be able to afford the expenses involved in undergoing preparatory courses for upgrading their certificates. They also felt that on the basis of the experience on Inland Vessel IV personnel should be promoted to serve on River Sea Vessels and vessels engaged in Near Coastal Voyages.

But a number of Inland Vessel Owners recognize the importance and urgent need of compulsory preparatory courses for all Inland Vessel Certifications. These Inland Vessel Owners also agree that the Inland Vessel COC holders must undergo some training before they are upgraded to River Sea and Vessels engaged in Near Coastal Voyages.

1.10 Summary

1.10.1 Chapter –I deals with general provisions, definitions and clarifications

1.10.2 Chapter - II and III deal with the eligibility criteria for obtaining the certificate of competencies as Masters, Engineers and Watch Ratings of Inland Vessels.

1.10.3 Chapter IV deals with radio communication requirements for IV personnel.

1.10.4 Chapter V deals with Standards regarding special training requirements for personnel on certain types of Inland Vessels

1.10.5 Chapter VI deals with Emergency, occupational safety, security, medical care and survival functions for Inland Vessels.

1.10.6 Chapter VII deals with alternate certification and Chapter VIII deals with watchkeeping requirements on Inland Vessels.

1.10.7 Chapter IX deals with the safe manning requirements for Inland Vessels.

1.10.8 Chapter X deals with the Syllabus for Inland Vessel Deck and Engine Departments

1.10.9 Chapter XI gives the progression path for upgrading from inland motor Vessel to vessels engaged on Near Coastal Voyages.

1.10.10 Annexure I deal with the results of comparison of safe manning of Kerala, Goa, Maharashtra, Gujarat and West Bengal and also the views of discussions held with various stake holders in Inland water transport.

1.11 Conclusion–

Based on this dissertation following conclusions could be drawn. Most importantly the study finds that in spite of IV Act amendment 2007 there is little or no standardization, support for the sector in terms of financial aid neither to training and certification establishment nor to the trainees.

1.11.1 To have a safe and efficient inland water and river sea transport, the personnel operating the vessels in these waters should be qualified, suitably trained and competent enough to shoulder the task duties and responsibilities.

1.11.2 The existing system of inducting the people in Inland water sector differs from state to state. The training before they are placed on board varies from state to state as only a few states have the facilities for training the new entrants. The certificates issued by many training institutes to these people are not recognized for further employment.

The current system of training, assessment and certification of Masters, Engine Drivers and Engineers needs to be standardized. There should be uniform standards for eligibility of candidate for appearing in any competency exam.

1.11.3 The Inland water transport stake holders understand the urgent need of standard syllabus and preparatory courses for candidates before they appear in any competency exam.

By giving some area specific training, the crew will be able to operate vessels in other states. This will open up great opportunities for them.

1.11.4 With the invent of River Sea Vessels and the DG shipping allowing Inland Vessel COC holder to serve on River Sea Vessel, the Inland Vessel COC holders will have even better career prospect.

1.11.5 As one of the recommendations in IV induction and training is about 6 months residential program the central and state governments should allocate some subsidies so that IV cadre to support much larger IV fleet becomes possible to enhance countries logistic chain and use of environment friendly water transport to replace some of road/rail transportation. Investment could come from carbon credits.

1.11.6 This study also finds that the IV sector which is an important input to RSV and therefore to NCV lacks seafarer employment conditions uniformity including medical fitness. Therefore, in view of MLC 2006 coming into force it is suggested that appropriate medical fitness standard for all seafarers should be as prescribed by ILO/DGS.

1.11.7 This study which reflects closely standards of training, certification and watchkeeping 1995 as amended in 2010, in particular emphasis on demonstration of competency rather than theoretical knowledge. Therefore IV training and assessment should be practical oriented bearing in mind minimum entry point is 10th pass and or with ratings background.

Part A

INLAND VESSEL MODEL STANDARDS' OF TRAINING, CERTIFICATION AND WATCHKEEPING (IV STCW) INDIA

CHAPTER 1

General Provisions

1. Short title and commencement - These rules may be called the Inland Vessel Standards of Training Certification and Watchkeeping Rules.
2. Application-These rules shall apply to any candidate who is a citizen of India and is permitted by the Chief Examiner concerned to be examined, assessed and certified under these rules.

3. Objective -The objective of these rules is to provide uniform standards of training, certification and watchkeping for IV personnel.

4. Definitions

(1) In these rules, unless the context otherwise requires.--

a. "Act" means the Inland Vessel Act, 1917 as amended;

b. "Appropriate certificate" means a certificate issued and endorsed in accordance with the provisions of these rules and entitling the lawful holder thereof to serve in the capacity and perform the functions involved at the level of responsibility specified therein on a ship of the type, tonnage or power indicated by the endorsement while engaged on the particular inland voyage concerned;

c. "Approved" means approved by the Central Government;

d. "Training and Assessment Programme" means the programme of training and assessment of IV personnel as approved by the Central Government;

e. "Assessment Centre" means a center designated by the Director General of Shipping responsible for assessment of candidates and maintaining records for the purposes of assessment;

f. "Certificate of competency" means an appropriate certificate issued by the State Government for the purposes of rule 5;

g. Chief Examiner" means the Chief Examiner of Inland Vessel Master and Deck Department personnel or the Chief Examiner of Inland Vessel Engine Department personnel, as the case may be;

h. "Company" means the owner of the inland vessel or any other organization or person such as the manager or the bareboat charterer, who has assumed the responsibility for operation of the inland vessel from the vessel owner and who, on assuming such responsibility, has agreed to take all the duties and responsibilities imposed on the company by the IV STCW Rules;

i. "Examiner" means Chief surveyor & Marine Engineer/ Chief Port Officer as the case may be, appointed under the IV Act;

j. "Form" means a form appended to these rules;

k. "Month" means a month reckoned according to the British calendar. The time included between any given day in any month and the preceding day of the following month (both days inclusive) shall be reckoned as one month;

l. "Inland Voyages" means the Inland water trade or voyages within inland water limits;

m. "STCW Convention" means International Convention on Standards of Training, Certification and Watchkeeping 1978 as amended in 2010.

n. "Year" means a year reckoned according to the British calendar.

(2) Words and phrases used in these rules and not defined but defined in the Act shall have the meanings respectively assigned to them.

5. Issuance of certificate of competency.

(1) A Certificate of Competency may be issued for the following grades, namely:-

(i) Deck Rating;

(ii) Deck Watch Rating

(iii) Master Class 3;

(iv) Master Class 2;

(v) Master Class 1;

(vi) Engine Rating;

(vii) Engine Watch Rating;

(viii) Engineer Class 3;

(ix) Engineer Class 2;

(x) Engineer Class 1.

6. Training and assessment.- The Chief Examiner concerned shall ensure that the training and assessment of candidates for certification as a IV Personnel are administered, supervised and monitored in accordance with the provisions of the Act and IV STCW rules and those persons responsible for imparting the training and assessment as required under the IV STCW Rules, are appropriately qualified for the type and level of training and assessment of competence in accordance with the provisions of the Act.

7. Quality standards.-The Chief Examiner concerned shall ensure that all the training assessment of competence, certification, endorsement and revalidation activities under his authority are continuously monitored through a quality standards system including the qualifications and experience of instructors and assessors.

8. Standards of medical fitness.-

(1) Every candidate for certification as a IV Personnel shall provide satisfactory proof of the following documents to the Chief Examiner concerned, namely:-

(a) a certificate showing the date of birth; and

(b) a medical fitness certificate including eyesight and hearing as prescribed by DGS in the Merchant Shipping (Medical Examination) Rules

(2) The standards of medical fitness for the candidates shall be the same as given in the Merchant Shipping (Medical Examination) Rules.

9. Examination, assessment, certification and registration of Certificates - (1) The Director General of Shipping shall designate an Assessment Centre.

(2) The Assessment Centre shall-

(a) maintain records of all candidates with regard to their IV service, progress of ashore and on-board training courses attended, examinations and assessments completed and certificates held by the IV personnel;

(b) receive periodical returns of the progress of ashore and on board training and also monitor such returns;

(c) examine the documentary evidence that the candidate has fulfilled the eligibility criteria for joining an approved training and assessment programme; and

(d) assist the Chief Examiner or Examiner concerned, as the case may be, in the conduct of written, oral and practical examinations and assessment on completion of the approved training and assessment programme for each function.

(3) Every IV personnel shall carry all appropriate certificates in original while serving in a relevant capacity on board an inland vessel in accordance with the applicable safe manning requirements as provided in these rules.

10. Revalidation and upgrading of certificates.-

(1) Every person who holds an appropriate certificate in accordance with the IV Act and the rules framed thereunder prior to the date of commencement of these rules, may apply for revalidation and upgrading. Such candidate shall --

(i) meet the standards of medical fitness as prescribed in the Merchant Shipping (Medical Examination) Rules; ii) complete an

approved refresher and updating course

(iii) be subject to scrutiny and assessment by an assessment center; and

(iv) be issued with a certificate regarding complying with the requirements of the IV STCW Rules whereupon the earlier certificate shall be withdrawn.

(2) Every person holding an appropriate certificate who is serving at inland waterways or intends to return to inland waterways for service after a period ashore in order to continue to qualify for IV service at intervals not exceeding five years, shall-

(i) meet the standards of medical fitness as prescribed in the Merchant Shipping (Medical Examination) Rules,

(ii) establish continued professional competence by attending an approved revalidation course in accordance,

(iii) be subject to scrutiny and assessment by an assessment center, and

(iv) be issued with an endorsement revalidating the candidate's certificate.

11. Indian Naval officers - Indian Naval officers holding valid certificate of service who intend to become holders of a certificate of competency complying with the requirements of these rules shall be required to complete approved training and assessment programme prior to issuance of a certificate of competency. Such candidate's existing experience, qualifications and certificates shall form the basis for determining qualifying inland vessel service as per approved training and assessment programme.

12. Responsibilities of the company-

(1) The company shall provide written instructions to the Master for policies and procedures and be responsible for the assignment of IV personnel for service in their vessels in accordance with the provisions of these rules and it shall ensure that-

(a) each IV personnel assigned to any of its vessels holds an appropriate certificate in accordance with the provisions of the IV STCW Rules;

(b) its vessels are manned in compliance with the applicable safe manning requirements as provided in these rules;

(c) documentation and data including their experience, training medical fitness and competency in assigned duties relevant to all IV personnel employed on its vessels are maintained and readily accessible to all concerned;

(d) IV personnel, on being assigned to any of its inland vessels are familiarized with their specific duties and with arrangements installations, equipment,

procedures and vessel characteristics that are relevant to their routine or emergency duties.

(e) the vessel's complement can effectively co-ordinate their activities in an emergency situation and in performing functions vital to safety or to the prevention or mitigation of pollution; and

(f) the Master of the vessel under whose command an individual personnel sails on a particular inland vessel shall be responsible to the company in respect of his duties and obligations.

13. The IV certificate of competency issued by one state shall be endorsed by other states after necessary assessment as follows:

a) Certificate of competency of Master Class 1, Master Class 2 and Master Class 3 shall have approved 6 months of service in the inland water of the state endorsing the certificate of competency as second in-charge on a vessel size appropriate to certificate of competency or have attended familiarization course for endorsement.

b) Certificate of competency of IV Engineer Class 1, Engineer Class2 and Engineer Class 3 shall be endorsed without any service or familiarisation course.

Chapter II Inland Vessel Master and Deck department

II/1 Mandatory minimum requirements for certification of Master Class 3(Serang) of an Inland Vessel

1. Every candidate serving on an Inland Vessel as Master Class 3 (Serang) shall hold a certificate of competency.
2. Every candidate for certification shall:

i. be not less than 19 years of age ii. meet the medical standards as per DGS rules iii. be able to read and write English and official language of the state iv. have two and half years of service as deck rating on Inland Vessel with 6 months induction training

or

have three years of service as deck rating on inland Vessel

or

have one and half years apprenticeship as Inland Vessel Deck Cadets with SSTP iv) have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

v) have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table-II/1

II/2 Mandatory minimum requirements for certification of Master Class 2 (2nd ClassMaster) of an Inland Vessel

1. Every candidate serving on an Inland Motor Vessel as Master Class 2 shall hold a certificate of competency.
2. Every candidate for certification shall:

i. be not less than 21 years of age ii. meet the medical standards as per DGS rules iii. hold a COC of Master class III

iv. have three years of service as deck watch rating of inland vessel having more than 250 GT out of which six months while holding a COC of Master Class 3.

or

have two years of service as Master Class 3 of an Inland vessel having less than 250 GT. or

have six years of service as deck rating on inland vessel of less than 250 GT and at least six months service on inland vessel of more than 250 GT.

v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

vi. have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table-II/2

II/3 Mandatory minimum requirements for certification of Master Class I of an Inland Vessel

1. Every candidate serving on an Inland Vessel as Master Class I shall hold a certificate of competency.
2. Every candidate for certification shall:
   i. be not less than 23 years of age
   ii. meet the medical standards as per DGS rules
   iii. hold a COC of Master class II
   iv. have two years of service as Master of an Inland vessel of not less than 250 GT while holding a Certificate of Competency as Master Class 2 or

have two years of service as second In-charge of an Inland Vessel of not less than 500 GT while holding a Certificate of Competency as Master Class 2 or

have 2nd Mate FG certificate or NWKO certificate or Mate NCV certificate and one year experience as Mate or second In-charge of Inland vessel of not less than 500 GT.

   v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4 vi. have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table II/3

II/4 Mandatory minimum requirements for certification of Deck Watch Rating (Laskar)

1. Every candidate serving on an Inland Motor Vessel as deck watch rating shall hold a certificate of competency
2. Every candidate for certification shall
   i. be not less than 17 years of age
   ii. meet the medical standards as per DGS rules
   iii. hold an approved IV Induction Training certificate(Deck/GP)
   iv. have served on Inland Vessel for not less than 12 months
   v. be able to read and write English and official language of state

vi. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

vii. have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table - II/4

II/5 Mandatory minimum requirements for IV Induction Training Certification (Deck/GP)

1. Every candidate for certification shall

i. be not less than 16 years and not more than 25 years of age ii. be 10th Pass (English as one of the subjects) iii. meet the medical standards as per DGS rules iv. have completed approved IV Induction education and training.

v. have completed approved and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

II/6

Grant of Certificate of Competency for Ex Army/Navy/Coast guard personnel

1. Every candidate for Grant of Certificate of Service equivalent to Certificate of Competency shall

i) be under 65 years of age ii) meet the medical standards as per DGS rules iii) have served in the Army/Navy/Coast guard in the equivalent capacity of a vessel for a period of not less than 3 year

iv) hold an experience certificate for subpara iii above from the concerned department

v) have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

v) have completed approved education, training, and assessment and meet the standard of competence in the certificate of competency tables II/1, II/2, II/3, II/4 for which equivalence is seeked.

Deck Competency Tables

Table II/1

Specification of minimum standards of competence for Master Class 3

Function: Navigation

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Steer the vessel and comply with helm orders	1. Knowledge of magnetic compass. 2. Knowledge of steering system on Inland vessels such as rod and chain, electrohydraulic, SRP and jet system. 3. Helm orders and steering steady courses.	Assessment of evidence obtained from one or more of the following: 1. approved inservice experience (TAR Book). 2. practical test	A steady course is steered. Course alterations are smooth and controlled.

Maintain a safe navigational watch	*Watchkeeping* 1. Basic knowledge of Rules of the Road. 2. Knowledge of the principles to be observed in keeping a navigational watch. 3. Navigation near barrages, dams, canals and rivers. 4. Knowledge of tide and currents. 5. Knowledge of buoyage system. 6. Knowledge of writing log books and weather reports. 7. Knowledge of rivers, canals and waterways	Assessment of evidence obtained from approved inservice experience.(TAR Book).	The conduct, handover and relief of the watch conforms with accepted principles and procedures. A proper look-out is maintained at all times and in conformity with accepted principles and procedures. Lights, shapes and sound signals conform with the requirements contained in the Regulations and are correctly recognized. The frequency and extent of monitoring of traffic, the vessel's position and the environment

			conforms with accepted principles and procedures. Action to avoid close encounters and collision with other vessels is in accordance with the collision regulations. A proper record is maintained of movements and activities relating to the navigation of the vessel.

Respond to emergencies	*Emergency procedures:* 1. Precautions for the protection and safety of passengers in emergency situations 2. Initial assessment of damage and damage control 3. Action to be taken following a collision /grounding 4. Action to be taken on engine / steering failure 5. Rescuing persons from the water	Assessment of evidence obtained from one or more of the following: 1. approved inservice experience (TAR Book). 2. practical instruction	The type and scale of the emergency is promptly identified. Initial actions appropriate to the urgency of the situation and the nature of the emergency are taken. Awareness of the company instructions on emergency handling.
Respond to a storm, and distress signal	Knowledge of Storm, Distress and Emergency signal.	Assessment of evidence obtained from practical instruction.	The storm, distress or emergency signal immediately recognized and acted upon in accordance with instructions and standing orders of the company and or competent authority.
Manoeuver the vessel	Knowledge of Vessel manoeuvring and handling in rivers and channels- 1. Turning circles and stopping distances. 2. Turning an Inland Vessel 3. Proper procedures to bring the vessel to an anchor and get	Assessment of evidence obtained from approved inservice experience.(TAR Book).	Safe operating limits of vessel propulsion, steering and power systems are not exceeded in normal manoeuver Adjustments made to the vessel course and speed to maintain safety of
	underway. 4. Proper procedure to bring her to jetty, pier or wharf and casting off.		navigation.

Function: Cargo Handling and stowage

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Monitor the loading, stowage, securing, care during the voyage and unloading of cargoes.	**1.** Knowledge of cargo safety, cargo stowage, handling and securing of cargo cargoes including liquid cargo. **2.** Importance of ventilation during voyage. **3.** Types of hatches & their operations. **4.** Transfer of cargo…Bunkering operations etc. .	Examination oral/written	Cargo operations are carried out in accordance with the cargo plan or other documents.

Function: communications

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Communication with shore radio stations and other vessels using VHF	*VHF, EPIRB and SART operation* Knowledge of procedures appropriate to the vessels concerned and the operations on which they are engaged.	Examination and assessment of evidence obtained from VHF/RT/GMDSS GOC/ROC certificate applicable.	Operational and emergency communications are carried out in accordance with operational instructions and emergency or contingency plans

Function: Controlling the operation of the vessel and care for persons on board

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and antipollution procedures.* Knowledge of the precautions to be taken to prevent pollution of the marine environment. Knowledge of prohibition of dumping anything in water. Knowledge of anti-pollution procedures and use of associated equipment.	Examination oral/written	Procedures for monitoring onboard operations and ensuring compliance with anti-pollution requirements are fully observed.
Maintain seaworthiness of the vessel	*Vessel stability* Basic intact stability, CG, COB, GM. Factors that affect List and trim. Actions to be taken in the event of partial loss of intact buoyancy. *Vessel construction* General knowledge of the principal structural members of an inland vessel and the proper names for the various parts	Examination oral/written	Actions to ensure and maintain the stability and watertight integrity of the vessel are in accordance with accepted practice
Prevent, control and fight fires on board	*Fire prevention and firefighting appliances* 1. Knowledge of fire prevention. 2. Knowledge of classes and chemistry of fire. 3. Knowledge of fire-fighting systems. 4. Understanding of action to be taken in the event of fire, including fires involving oil and chemical systems.	Assessment of evidence obtained from approved fire-fighting training and experience (FPFF)	The type and scale of the problem is promptly identified and initial actions are taken as per the emergency procedures Evacuation, emergency shutdown and isolation procedures are appropriate to the
			nature of the emergency and are implemented promptly.

Operate life-saving appliances	*Life-saving* 1. Ability to organize abandon ship drills. 2. Knowledge of the operation of survival crafts, their launching appliances and arrangements 3. Knowledge of use of survival craft equipment. 4. Knowledge of survival techniques appropriate to the areas of operation of the vessel	Assessment of evidence obtained from approved training and experience (PST)	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board	*Medical aid* Ability to provide first aid in the case of accidents that are likely to occur on board.	Assessment of evidence obtained from approved training (EFA)	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	1. Knowledge of the provisions of the Inland Vessel Act 1917 and rules framed thereunder. 2. Knowledge of Port rules, and IWAI rules.	Examination oral/written.	Procedures for monitoring operations and maintenance comply with local / state legislative requirements. Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment.
Organize and manage the crew	Knowledge of personnel management, on board ship.	Examination and assessment of evidence obtained from approved training PSSR.	The crew are allocated duties and informed of expected standards of work.
Crowd management	Knowledge of basic principle of crowd management so as to safely control entry, exit	Assessment of evidence obtained from approved in-service training and	Instructions to passengers are given with regard

	and stay of passengers onboard as per company or competent authority onstructions.	experience (TAR Book)	to embarkation, sitting and disembarkation. Use of life saving appliances and abandonship in case of emergency.

- **TAR book or company's sea service record, duly authenticated by INSA/ICCSA or such other body.**

Table II/2

Specification of minimum standards of competence for Master Class 2

Function: Navigation

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Plan and conduct a passage and determine vessel's position	Navigation- Ability to determine the vessel's position by the use of: 1. landmarks 2. aids to navigation, including lighthouses, beacons and buoys 3. depth contour 4. dead reckoning, taking into account the effects of winds, bore tides, currents and estimated speed. Knowledge of steering system on Inland vessels. Knowledge of and ability to use Inland Water and river navigation chart, river atlas, river pilots, tide tables, GPS, RADAR, and Echo sounder.	Examination and assessment of evidence obtained from one or more of the following: 1. approved inservice experience 2. approved laboratory equipment training using: charts of Inland waters, navigational publications, radio navigational warnings, azimuth mirror, GPS, RADAR and Echo sounder.	Information obtained from navigational charts and publications is interpreted correctly and applied. The position is determined within the limits of acceptable instrument/system errors. The reliability of the information obtained from the primary method of position fixing is checked at appropriate intervals. Charts selected are suitable for the area of navigation and charts are corrected in accordance with the latest information available. Interpretation and analysis of information obtained from radar is as per navigational practice and takes account of the limits and accuracy levels.
Plan and conduct a passage and determine vessel's	*Compasses* - 1. Knowledge of use and errors of magnetic & Gyro		Errors in magnetic & Gyro compasses are determined and

position	compasses. 2. Ability to determine errors of the compass using terrestrial objects, and to allow for such errors. *Meteorology* - 1. Ability to interpret and apply the meteorological information available. 2. Knowledge of seasons and general weather throughout the year in the area of operation.		applied correctly to courses and bearings. Meteorological information is evaluated and applied to maintain the safe passage of the vessel
Maintain a safe navigational watch	*Watchkeeping* 1. Knowledge of taking and handing over watch. 2. Knowledge of content, application and intent of the Rules of the Road. 3. Knowledge of the principles to be observed in keeping a navigational watch. 4. Knowledge of navigation near barrages, dams, canals and rivers. 5. Knowledge of tide, range and timings. 6. Knowledge of buoyage system. 7. Knowledge of writing of log books and weather reports. 8. Knowledge of rivers, canals and waterways	Examination and assessment of evidence obtained from approved inservice experience	The conduct, handover and relief of the watch as per principles and procedures. A proper look-out is maintained at all times. Lights, shapes and sound signals contained in the Regulations and are correctly recognized. The frequency and extent of monitoring of traffic and the vessel's position is as per accepted principles and procedures. Action to avoid close encounters and collision with other vessels is in accordance with the Regulations. A proper record is maintained of movements and activities relating to the navigation of the vessel.

Respond to emergencies	Knowledge of Emergency procedures: 1. Actions for the protection	Examination and assessment of evidence obtained	The emergency is promptly identified.

	and safety of passengers in emergency situations. 2. Initial assessment of damage and damage control. 3. Action to be taken following a collision / grounding. 4. Management of inland vessel under tow. 5. Action to be taken on engine / steering failure. 6. Rescuing persons from the water. 7. Appreciation of the action to be taken when emergencies arise in port.	from one or more of the following: 1. approved inservice experience. 2. practical instruction.	Initial actions are taken appropriate to the nature and urgency of the situation. Awareness of the company instructions on emergency handling.
Respond to a storm and distress signal	Knowledge of Storm, Distress and Emergency signal.	Examination and assessment of evidence obtained from practical instruction	The storm, distress or emergency signal immediately recognized and acted upon in accordance with instructions and standing orders of the company and or competent authority.

Manoeuvre the vessel	*Knowledge of Vessel manoeuvring and handling in rivers and channels-* 1. Effect of draught, trim, speed and, under keel clearance on turning circles and stopping distances. 2. Turning a vessel short round. 3. Proper procedures to bring the vessel to an anchor and get underway 4. Proper procedure to bring her to jetty, pier or wharf and casting off.	Examination and assessment of evidence obtained from approved inservice experience	Vessel propulsion and steering systems are operated safely. Adjustments made to the vessel course and speed to maintain safety of navigation.

Function: Cargo Handling and Stowage

Column 1	**Column 2**	**Column 3**	**Column 4**
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Plan and ensure safe loading, stowage, securing, care during the voyage and the unloading of cargoes	*Cargo handling, stowage and securing* 1. Knowledge of the effect of cargo on seaworthiness and stability of the vessel. 2. Knowledge of safe handling, stowage and securing of cargo.	Examination and assessment of evidence obtained from 1. approved in-service experience. 2. approved training ship experience	Cargo operations are carried out in accordance with the cargo plan or other documents and established safety onboard stowage limitations.
Inspect and report defects and damages to cargo spaces, hatch covers and ballast tanks.	Knowledge of detecting the damages and defects due to 1. loading and unloading operations 2. corrosion 3. severe weather conditions 4. severe weather conditions	Examination and assessment of evidence obtained from 1. approved in-service experience 2. approved training ship experience	Inspections are carried out, defects and damages are detected and reported.

Plan and ensure cargo hold ventilation.	Knowledge of Cargo Ventilation and Hatch arrangements.	Cargo Ventilation and Hatch arrangements.	Cargo hold ventilation is carried out in accordance with the requirements

Function: communications

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Communication with shore radio stations and other vessels	1. Basic knowledge of local signals. 2. Knowledge of VHF radio, EPIRB and SART operation procedures appropriate to the vessels concerned and the operations on which they are engaged.	Examination and assessment of evidence obtained from approved training and in-service experience.	Operational and emergency communications are carried out in accordance with operational instructions and emergency.

Function: Controlling the operation of the vessel and care for persons on board

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and antipollution procedures.* 1. Knowledge of the precautions to be taken to prevent pollution of the marine environment 2. Knowledge of anti-pollution procedures. 3. Knowledge of anti-pollution procedures and use of associated equipment.	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with antipollution requirements are fully observed.
Maintain seaworthiness of the vessel	*Vessel stability* 1. Working knowledge of factors that affect stability and trim. 2. Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy. 3. Understanding of the fundamentals of watertight integrity. *Vessel construction* General knowledge of the principal structural members of a vessel and the proper names for the various parts	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved laboratory equipment training	Actions to ensure and maintain the stability and watertight integrity of the vessel are in accordance with accepted practice.
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine	*Knowledge of the Regulations and other relevant legislation.* 1. Knowledge of the provisions of the Inland Vessel Act 1917 and rules framed thereunder. 2. Knowledge of Port rules, and	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements. Potential non-

environment	IWAI rules. 3. Knowledge of relevant DG Shipping notices, IWAI Circulars and Notices. 4. Knowledge of national legislation related to personnel matters. 5. Knowledge of Certificates and other documents required to be carried by the vessel.		compliance is promptly and fully identified. Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment.
Use of leadership and managerial skills	*Knowledge of onboard personnel management and training* 1. Ability to apply task and workload management. 2. Knowledge and ability to apply effective resource management.	Examination and assessment of evidence obtained from approved in-service training and experience	The crew are allocated duties and informed of expected standards of work. Training objectives and activities are based on an assessment of current competence and capabilities and operational requirements.

Deck Competency Tables

Table- II/3
Specification of minimum standards of competence for Master Class I
Function: Navigation

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Plan and conduct a passage and determine vessel's position	1. Navigation Ability to determine the vessel's position by the use of all navigation aids and equipment such as GPS, Echo Sounder, RADAR and ECDIS commonly fitted on board the vessels concerned. 2. Knowledge of steering system on Inland vessels. 3. Ability to use Inland Water, river navigation and coastal navigation charts and publications, such as sailing directions, tide tables, river atlas, river pilots, river notices, notices to mariners, radio navigational warnings. .	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved laboratory equipment training using: chart catalogues, charts, navigational publications[Hydrographic charts of Inland and coastal water], radio navigational warnings, azimuth mirror, electronic navigation equipment, echo sounding equipment,	Information obtained from navigational charts and publications is relevant, interpreted correctly and properly applied. The primary method of fixing the vessel's position is the most appropriate to the prevailing circumstances and conditions. The position is determined within the limits of acceptable instrument/system errors. The reliability of the information obtained from the primary method of position fixing is checked at appropriate intervals. Calculations and measurements of navigational information are accurate. Charts and publications selected are the largest scale on board suitable for the area of navigation and charts are corrected in accordance with the

			latest information available. Performance checks and tests of navigation systems comply with manufacturer's recommendations and good navigational practice. . Interpretation and analysis of information obtained from radar is in accordance with accepted navigational practice and takes account of the limits and accuracy levels of radar Route planning and monitoring on ECDIS is as per manuals.
Plan and conduct a passage and determine vessel's position	*Compasses* Knowledge of the errors of magnetic and gyro compasses. Ability to determine errors of the compass using terrestrial means, and to allow for such errors. *Meteorology* Ability to interpret and apply the meteorological information available. Knowledge of seasons and general weather throughout the year in the area of operation.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved laboratory equipment	Errors in Magnetic and Gyro compasses are determined and applied correctly to courses and bearings. Meteorological information is evaluated and applied to maintain the safe passage of the vessel

Maintain a safe navigational watch	*Watchkeeping* 1. Thorough knowledge of content, application and intent of the Rules of the Road. 2. Knowledge of the principles to be observed in keeping a navigational watch.	Examination and assessment of evidence obtained from approved in-service experience	A proper look-out is maintained at all times and in conformity with accepted principles and procedures. Lights, shapes and sound signals conform with the requirements contained in the

	3. Navigation near barrages, dams, canals and rivers. 4. Knowledge of tide, range and timings. 5. Knowledge of buoyage system. 6. Knowledge of tidal semaphores. 7. Knowledge of writing of log books and weather reports. 8. Knowledge of rivers, canals and waterways		Regulations and are correctly recognized. The frequency and extent of monitoring of traffic, the vessel and the environment conform with accepted principles and procedures. Action to avoid close encounters and collision with other vessels is in accordance with the Regulations. Decisions to adjust course and/or speed are both timely and in accordance with accepted navigation procedures. A proper record is maintained of movements and activities relating to the navigation of the vessel.

Respond to emergencies	Knowledge of emergency procedures, including: 1. Actions for the protection and safety of passengers in emergency situations. 2. Initial assessment of damage and damage control. 3. Action to be taken following a collision / grounding. 4. Management of inland vessel under tow. 5. Action to be taken on engine / steering failure. 6. Rescuing persons from the water. 7. Appreciation of the action to be taken when	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. practical instruction	Initial actions and, if appropriate manoeuvring are in accordance with contingency plans and are appropriate to the urgency of the situation and the nature of the emergency. Awareness of the company instructions on emergency handling.
	emergencies arise in port.		
Manoeuvre the vessel	*Vessel manoeuvring and handling* Knowledge of 1. Effect of dwt, draught, trim, speed and, under keel clearance on turning circles and stopping distances. 2. Turning a vessel short round. 3. Proper procedures to bring the vessel to an anchor and get underway. 4. Proper procedure to bring her to jetty, pier or wharf and casting off. 5. Knowledge of Squat and shallow water effects	Examination and assessment of evidence obtained from approved in-service experience	Safe operating limits of vessel propulsion, steering and power systems are not exceeded in normal manoeuvre Adjustments made to the vessel course and speed to maintain safety of navigation.

Function: Cargo Handling and stowage

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Plan and ensure safe loading, stowage, securing, care during the voyage and the unloading of cargoes	*Cargo handling, stowage and securing* 1. Knowledge of the effect of cargo on seaworthiness and stability of the vessel. 2. Knowledge of safe handling, stowage and securing of cargo. 3. Knowledge of operational and design limitations of inland vessels.	Examination and assessment of evidence obtained from approved in-service experience. approved training ship experience	Cargo operations are carried out in accordance with the cargo plan or other documents and established safety onboard stowage limitations.
Inspect and report defects and damages to cargo spaces, hatch covers and ballast tanks.	Knowledge of detecting the damages and defects due to loading and unloading operations corrosion severe weather conditions	Examination and assessment of evidence obtained from approved in-service experience approved training ship experience	Inspections are carried out, defects and damages are detected and reported.

Function: Communications

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Communication with shore radio stations and other vessels using VHF and/or MF radio communications appropriate to the vessels concerned and the operations on which they are engaged	Basic knowledge of the International Code of Signals and local signals. Knowledge of VHF and /or MF radio, EPIRB and SART operations procedures appropriate to the vessels concerned and the operations on which they are engaged	[Examination and]assessment of evidence obtained from approved training and in-service experience	Operational and emergency communications are carried out in accordance with operational instructions and emergency or contingency plans

Function: Controlling the operation of the vessel and care for persons on board

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and antipollution procedures.* 1. Knowledge of the precautions to be taken to prevent pollution of the marine environment. 2. Knowledge of anti-pollution procedures and use of all associated equipment.	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with anti-pollution requirements are fully observed.
Maintain seaworthiness of the vessel	*Vessel stability* Working knowledge of factors that affect stability and trim. Understanding of fundamental	Examination and assessment of evidence obtained from one or more of the following: 1 approved in-service	Actions to ensure and maintain the stability and watertight integrity of the vessel are in
.	actions to be taken in the event of partial loss of intact buoyancy. Understanding of the fundamentals of watertight integrity. *Vessel construction* General knowledge of the principal structural members of a vessel and the proper names for the various parts	experience 2 approved laboratory equipment training	accordance with accepted practice

Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	*Knowledge of the Regulations and other relevant legislation.* 1. Knowledge of the provisions of the Inland Vessel Act 1917 and rules framed thereunder. 2. Knowledge of Port rules, and IWAI rules. 3. Knowledge of relevant DG notices. 4. Knowledge of national legislation related to personnel matters. 5. Knowledge of Certificates and other documents required to be carried by the vessel.	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements. Potential noncompliance is promptly and fully identified. Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment.
Use of leadership and managerial skills	*Knowledge of onboard personnel management and training* 1. Ability to apply task and workload management. 2. Knowledge and ability to apply effective resource management.	Examination and assessment of evidence obtained from approved in-service training and experience	The crew are allocated duties and informed of expected standards of work. Training objectives and activities are based on an assessment of current competence and capabilities and operational requirements.

Deck Competency Tables Table – II/4

Specification of minimum standard of competence for Deck Watch Rating Function : Navigation

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Steer the ship and comply with helm orders	Knowledge of steering a steady course. Understanding of helm orders.	Assessment of evidence obtained from: .1 practical test, or .2 approved in-service experience	A steady course is steered within acceptable limits having regard to the area of navigation and prevailing sea state. Alterations of course are smooth and controlled .Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner.
Keep a proper look-out by sight and hearing	Responsibilities of a lookout, including reporting the approximate bearing of a sound signal, light or other object in degrees or points.	Assessment of evidence obtained from: 1 practical test, or 2 approved in-service experience	Sound signals, lights and other objects are promptly detected and their appropriate bearing in degrees or points is reported to the officer of the watch.
Operate emergency equipment and apply emergency procedures	Knowledge of emergency duties and alarm signals. Basic environmental protection procedure	Assessment of evidence obtained from demonstration and approved inservice experience	Initial action on becoming aware of an emergency or abnormal situation is in conformity with established practices and procedures.
Prevent, control and fight fires on board	*Fire prevention and firefighting appliances* Knowledge of classes and chemistry of fire. Knowledge of fire-fighting systems.	Assessment of evidence obtained from approved firefighting training and experience (FPFF)	The type and scale of the problem is promptly identified and initial actions are taken as per the emergency procedures and contingency plans for the vessel.

	Understanding of action to be taken in the event of fire, including fires involving oil and chemical systems.		Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly.
Operate lifesaving appliances	*Life-saving* knowledge of the operation of survival crafts, their launching appliances and arrangements, and their equipment. Knowledge of survival techniques appropriate to the areas of operation of the vessel	Assessment of evidence obtained from approved training and experience (PST)	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board	*Medical aid* Ability to provide first aid in the case of accidents that are likely to occur on board	Assessment of evidence obtained from approved training (EFA)	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life

Chapter III Inland Vessel Engine department

III/1

Mandatory minimum requirements for certification of Engineer Class 3 of an Inland Vessel

1. Every candidate serving on an Inland Vessel as Engineer Class 3 shall hold a certificate of competency.
2. Every candidate for certification shall:

i. be not less than 19 years of age ii. meet the Medical standard as per appendix-1

iii. be an ITI course passed in diesel/motor mechanic branch or Induction IV course passed at govt. approved institute iv. have served as Engine Room rating for not less than six years on Inland Motor Vessels of less than 113 BHP(85 kW).

or

have served as Engine Room rating for not less than four years on Inland Motor Vessels of not less than 113 BHP(85 kW).

or

have served as Engine Room rating for not less than three years on Inland Motor Vessels of not less than 226 BHP(170 kW).

or

have served as an Inland Vessel Cadet Engine apprentice with SSTP for one and half years on Inland Motor vessel of not less than 226 BHP(170 kW) or two and half years on Inland Motor vessel of less than 226 BHP(170 kW).

v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4 vi. have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table - III/1

III /2 Mandatory minimum requirements for certification of Engineer Class 2 of an Inland Vessel

1. Every candidate serving on an Inland Vessel as Engineer Class 2 shall hold a certificate of competency.
2. Every candidate for certification shall:

i. be not less than 21 years of age ii. meet the Medical standard as per appendix-1

iii. have a certificate of competency of Engineer Class 3 of an Inland Vessel iv. have served as second in-charge of an Inland vessel of not less than

565BHP(425 kW) for not less than two years

or

have served as in-charge on Inland vessel of not less than 226 BHP (170 kW) for not less than two years

or

have served as in-charge on Inland vessel of not less than 113 BHP (85 kW) for not less than three years

or

have served as in-charge on Inland vessel of less than 113 BHP (85 kW) for not less than four years

v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4 vi. have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table - III/2

III/3

Mandatory minimum requirements for certification of Engineer Class 1 of an Inland Vessel

1. Every candidate serving on an Inland Vessel as Engineer Class 1 shall hold a certificate of competency.
2. Every candidate for certification shall:
   i. be not less than 23 years of age
   ii. meet the Medical standard as per appendix-1
   iii. have a certificate of competency of Engineer Class 2 of an Inland Vessel
   iv. have served as second in-charge for not less than two years on Inland vessel of not less 565 BHP (425 kW)

   or

   have served as second in-charge for not less than three years on Inland vessel of not less than 226BHP(170 kW)

   or

   have served as engineer in-charge for not less than two years on Inland vessel of not less than 226 BHP(170 kW)

   v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

   vi. have completed approved education, training, examination and assessment and meet the standard of competence as specified Table - III/3

III/4 Mandatory minimum requirements for certification of Engine Watch Rating

1. Every candidate serving on an Inland Motor Vessel shall as Engine Watch Rating shall hold a certificate of competency
2. Every candidate for certification shall
   i. be not less than 17 years of age
   ii. meet the Medical standard as per appendix-1 iii.

   hold an approved IV Induction Training certificate(Engine/GP)

   iv. have served on inland vessel for not less than 12 months

   v. be able to read and write English and State's local language

vi. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

vii. have completed approved education, training, examination and assessment and meet the standard of competence as specified in Table – III/4

III/5 Mandatory minimum requirements for IV Induction Training Certificate (Engine/GP)

1. Every candidate for certification shall:

i. be not less than 16 years and not more than 25 years of age ii. be 10^{th} standard pass with English as one subject iii. meet the Medical standard as per appendix-1 **iv.** have completed approved IV Induction education and training.

v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

III/6 Grant of Certificate of Competency for Ex Army/Navy/Coast guard personnel

1. Every candidate for Grant of Certificate of Service equivalent to Certificate of Competency shall

i. be under 65 years of age

ii. meet the medical standards as per appendix – 1

iii. have served in the Army/Navy/Coast guard in the equivalent capacity of a vessel for a period of not less than 3 year

iv. hold an experience certificate for subpara iii above from the concerned department

v. have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

vi. have completed approved education, training, and assessment and meet the standard of competence in the certificate of competency tables III/1, III/2, III/3, III/4 for which equivalence is seeked.

Engine Competency Tables

Table -III/1

Specification of minimum standard of competence for Engineer class 3

Function: Marine Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Maintain a safe engineering watch	Thorough knowledge of principles to be observed in keeping an engineering watch including: .1 duties associated with taking over and accepting a watch .2 routine duties undertaken during a watch .3 maintenance of the machinery space log book and the significance of the readings taken. .4 duties associated with handing over a watch. Safety and emergency procedures: .1 changeover of remote/automatic to local control of all systems. .2 Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil and chemical systems	Examination or assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with the accepted principles and procedures. The frequency and extent of monitoring of engineering equipment and systems conforms to manufacturers' recommendations and accepted principles and procedures, including principles to be observed in keeping an engineering watch. A proper record is maintained of the movements and activities relating to the vessel's engineering systems
Operate main and auxiliary machinery and associated control systems	Knowledge of : .1 working of various types of Internal Combustion Engine. (applicable limited power) .2 Use and management of different valves, forks, pipes and connections. .3 Various methods of supplying air and fuel to the cylinder. .4 Nature and properties of fuel oil and chemical.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment. The output of plant and engineering

	.5 preparation of main and auxiliary machinery for operation . .6 causes which make the engine difficult to start and remedies .7 mechanism of the starting and reversing arrangements. .8 Steering gear .9 deck machinery		systems consistently meets requirements including bridge orders relating to changes in speed and direction. The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the vessel and the plant having regard to the prevailing circumstances and conditions
Operate pumping systems and associated control systems	Pumping systems: .1 routine pumping operations .2 operation of bilge and ballast pumping systems. .3 Dangers resulting due to leakages from the fuel oil and chemical tanks. .4 Safe bunkering, ballasting and deballasting. .5 maintenance of machinery including pumps and piping systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training .3 approved simulator training, where appropriate	Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of the marine environment. Precautions are taken to safe guard against fire and explosion due to fuel oil and chemical leakages.

Function: Electrical Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Operate alternators, generators and control systems	Generating plant: Appropriate basic electrical knowledge and skills Preparing, starting, coupling and changing over alternators or generators. Location of common faults and action to prevent damage. Control systems: Location of common faults and action to prevent damage	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations
Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations	Safety requirements for working on onboard electrical systems. Construction and operational characteristics of onboard AC and DC electrical systems and equipment. Construction and operation of electrical test and measuring equipment.	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Implementation of safety procedures is satisfactory. Selection and use of test equipment is appropriate and interpretation of results is accurate. Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice. Commissioning and performance testing of equipment and systems brought back into service after repair is in accordance with manuals and good practice

Function: Maintenance and repair

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Use appropriate tools for construction and repair operations typically performed on vessels	.1 Characteristics and limitations of materials used in construction and repair of vessels and equipment .2 Characteristics and limitations of processes used for construction and repair .3Properties and parameters considered in the construction and repair of systems and components .4 Application of safe working practices in the workshop environment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Identification of important parameters for construction of typical vessel related components is appropriate. Selection of material is appropriate. Construction is to designated tolerances. Use of equipment and machine tools is appropriate and safe
Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment	Design characteristics and selection of materials in construction of equipment. Interpretation of machinery drawings and handbooks. Operational characteristics of equipment and systems	Assessment of evidence obtained from one or more of the following: .1 approved workshop skill training .2 approved practical experience and tests	Safety procedures followed are appropriate. Selection of tools and spare gear is appropriate. Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice Re-commissioning and performance testing is in accordance with manuals and good practice

Maintain marine engineering systems including control systems	*Marine engineering systems* Appropriate basic mechanical knowledge and skills. *Safety and emergency procedures*: Safe isolation of electrical and other types of plant and equipment required	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory	Isolation, dismantling and reassembly of plant and equipment is in accordance with accepted practices and procedures.
	before personnel are permitted to work on such plant or equipment .Undertake overhauling of engine. Understands wear and tear of machinery.	equipment training	Action taken leads to the restoration of plant by the method most suitable and appropriate to the prevailing circumstances and conditions

Function: Controlling the operation of the vessel and care for persons on board

Column 1	**Column 2**	**Column 3**	**Column 4**
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment* Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with local requirements are fully observed

Prevent, control and fight fires on board	*Fire prevention and firefighting Appliances.* Knowledge of fire prevention and classes and chemistry of fire Ability to organize fire drills Knowledge of fire-fighting systems And action to be taken in the event of fire, including fires involving oil and chemical systems	Assessment of evidence obtained from approved fire-fighting training and experience	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly The order of priority, and the levels and time scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem
Maintain seaworthiness of the vessel	*Vessel stability* Working knowledge of factors affecting stability and trim Understanding of the fundamentals of watertight integrity Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy *Vessel construction* General knowledge of the principal structural members of a vessel and the proper names for the various parts	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Actions to ensure and maintain the watertight integrity of the vessel are in accordance with accepted practice

Operate lifesaving appliances	*Life-saving* Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment Knowledge of survival at sea techniques	Assessment of evidence obtained from approved training and experience	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board	*Medical aid* Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board	Assessment of evidence obtained from approved training	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	Knowledge of the relevant regulations.	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements Potential noncompliance is promptly and fully identified Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment

Engine Competency Tables

Table-III/2

Specification of minimum standard of competence for Engineer Class 2

Function: Marine Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Maintain a safe engineering watch	Thorough knowledge of principles to be observed in keeping an engineering watch including: .1 duties associated with taking/handing over a watch .2 routine duties undertaken during a watch .3 maintenance of the machinery space log book and the significance of the readings taken .4 Safety and emergency procedures; changeover of remote/automatic to local control of all systems. .5 Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil and chemical systems.	Examination or assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with accepted principles and procedures. The frequency and extent of monitoring of engineering equipment and systems conforms to manufacturers' recommendations and accepted principles and procedures, including principles to be observed in keeping an engineering watch. A proper record is maintained of the movements and activities relating to the vessel's engineering systems.
Operate main and auxiliary machinery and associated control systems	Knowledge of : .1 working of various types of Internal Combustion Engine. .2 Use and management of different valves, forks, pipes and connections. .3 Various methods of supplying air and fuel to the cylinder. .4 preparation of main and auxiliary machinery for operation. .5 causes which make the engine difficult to start and remedies .6 Nature and properties	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment. The output of plant and engineering systems consistently meets requirements including bridge orders relating to changes in speed and direction.

	of fuel oil and chemical. .7 mechanism of the starting and reversing arrangements .8 Trouble shooting of engines .9 Steering gear .10 deck machinery. .11 Shafting installations including propellers		The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the vessel and the plant having regard to the prevailing circumstances and conditions
Operate pumping systems and associated control systems	Pumping systems: .1 routine pumping operations .2 operation of bilge and ballast pumping systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment
Manage fuel and ballast operations	Knowledge of .1Operation and maintenance of machinery including pumps and piping systems .2.3 Dangers resulting due to leakages from the fuel oil and chemical tanks. 4 Safe bunkering and ballasting / deballasting.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved simulator training, where appropriate	Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of the marine environment. Precautions are taken to safe guard against fire and explosion due to fuel oil and chemical leakages.

Function: Electrical Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations	Safety requirements for working on onboard electrical systems. Construction and operational characteristics of onboard AC and DC electrical systems and equipment. Construction and operation of electrical test and measuring equipment Detection of electric malfunction, location of faults and measures to prevent damages Interpretation of electrical and simple electronic diagrams	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Implementation of safety procedures is satisfactory. Selection and use of test equipment is appropriate and interpretation of results is accurate. Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice. Commissioning and performance testing of equipment and systems brought back into service after repair is in accordance with manuals and good practice
Operate alternators, generators and control systems	*Generating plant*: Appropriate basic electrical knowledge and skills Preparing, starting, coupling and changing over alternators or generators. Location of common faults and action to prevent damage. *Control systems*: Location of common faults and action to prevent damage	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations

Function: Maintenance and repair

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Use appropriate tools for construction and repair operations typically performed on vessels	.1 Characteristics and limitations of materials used in construction and repair of vessels and equipment .2 Characteristics and limitations of processes used for construction and repair .3Properties and parameters considered in the construction and repair of systems and components .4 Application of safe working practices in the workshop environment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Identification of important parameters for construction of typical vessel related components is appropriate. Selection of material is appropriate. Use of equipment and machine tools is appropriate and safe
Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment	Design characteristics and selection of materials in construction of equipment. Interpretation of machinery drawings. Operational characteristics of equipment and systems	Assessment of evidence obtained from one or more of the following: .1 approved workshop skill training .2 approved practical experience and tests	Safety procedures followed are appropriate. Selection of tools and spare gear is appropriate. Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice. Re-commissioning and performance testing is in accordance with manuals and good practice

Maintain marine engineering systems including control systems	*Marine engineering systems* – Appropriate basic mechanical knowledge and skills. *Safety and emergency procedures*:-	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory	Isolation, dismantling and reassembly of plant and equipment is in accordance with accepted practices and procedures. Action taken leads to
	Safe isolation of electrical and other types of plant and equipment required before personnel are permitted to work on such plant or equipment. Undertake overhauling of engine. Undertake valve and injector setting of engine. Able to replace liner and head of engines. Understands wear and tear of machinery.	equipment training	the restoration of plant by the method most suitable and appropriate to the prevailing circumstances and conditions

Function: Controlling the operation of the vessel and care for persons on board

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment* – Knowledge of the precautions to be taken to prevent pollution of the marine environment. Anti-pollution procedures and all associated equipment	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with local requirements are fully observed

Prevent, control and fight fires on board	*Fire prevention and fire-fighting Appliances* Knowledge of fire prevention and classes and chemistry of fire Ability to organize fire drills. Knowledge of firefighting systems And action to be taken in the event of fire, including fires involving oil and chemical systems	Assessment of evidence obtained from approved fire-fighting training and experience	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans. Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly. The order of priority, and the levels and time - scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem
Maintain seaworthiness of the vessel	*Vessel stability* – Working knowledge of factors affecting stability and trim. Understanding of the fundamentals of watertight integrity. Understanding of fundamental actions to	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Actions to ensure and maintain the watertight integrity of the vessel are in accordance with accepted practice
	be taken in the event of partial loss of intact buoyancy. *Vessel construction* General knowledge of the principal structural members of a vessel and the proper names for the various parts		

Operate lifesaving appliances	*Life-saving* – Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment. Knowledge of survival at sea techniques	Assessment of evidence obtained from approved training and experience	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board	ability to take effective action in case of accidents or illnesses that are likely to occur on board	Assessment of evidence obtained from approved training	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	Knowledge of the relevant legislation	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements. Potential noncompliance is promptly and fully identified. Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment

Engine Competency Tables

Table -III/3

Specification of minimum standard of competence for Engineer Class 1 of Inland Motor Vessel Function: Marine Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Maintain a safe engineering watch	Thorough knowledge of principles to be observed in keeping an engineering watch including: .1 duties associated with taking over and accepting a watch .2 routine duties undertaken during a watch .3 maintenance of the machinery space log book and the significance of the readings taken .4 duties associated with handing over a watch Safety and emergency procedures; changeover of remote/automatic to local control of all systems Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil and chemical systems	Examination or assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with accepted principles and procedures. The frequency and extent of monitoring of engineering equipment and systems conforms to manufacturers' recommendations and accepted principles and procedures, including principles to be observed in keeping an engineering watch. A proper record is maintained of the movements and activities relating to the vessel's engineering systems
Operate main and auxiliary machinery and associated control systems	Knowledge of : .1 working of various types of Internal Combustion Engine. .2 Use and management of different valves, forks, pipes and connections. .3 Various methods of supplying air and fuel to the cylinder. Construction of the apparatus for carbureting, atomizing or gasifying the fuel, and means for cooling the cylinders, pistons, etc. .4 preparation of main and auxiliary machinery for operation .	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment. The output of plant and engineering systems consistently meets requirements including bridge orders relating to changes in speed and direction.

	.5 causes which make the engine difficult to start and remedies .6 mechanisms of the starting and reversing arrangements. .7 Nature and properties of fuel oil and chemical. .8 trouble shooting of engines. .9 take off and calculate indicator diagrams and understand action of gas in the cylinder. .10 testing the fairness of shafting		The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the vessel and the plant having regard to the prevailing circumstances and conditions
Operate pumping systems and associated control systems	Pumping systems: .1 routine pumping operations .2 operation of bilge and ballast pumping systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment.
Manage fuel and ballast operations	Knowledge of .1Operation and maintenance of machinery including pumps and piping systems .2 consumption of oil and chemicals, capacity of tanks. .3 Dangers resulting due to leakages from the fuel oil and chemical tanks. .4 Action of wire gauge diaphragms when placed in pipes and connections to oil and chemical tanks. .5 Safe bunkering and ballasting operation.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved simulator training, where appropriate	Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of the marine environment. Precautions are taken to safe guard against fire and explosion due to fuel oil and chemical leakages.

Function: Electrical Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations	Safety requirements for working on onboard electrical systems. Construction and operational characteristics of onboard AC and DC electrical systems and equipment. Construction and operation of electrical test and measuring equipment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Implementation of safety procedures is satisfactory. Selection and use of test equipment is appropriate and interpretation of results is accurate. Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice. Commissioning and performance testing of equipment and systems brought back into service after repair is in accordance with manuals and good practice
Operate alternators, generators and control systems	*Generating plant*: Appropriate basic electrical knowledge and skills. Preparing, starting, coupling and changing over alternators or generators. Location of common faults and action to prevent damage. *Control systems*: Location of common faults and action to prevent damage Construction of electric light engines, dynamos, electric motor, etc. Principal construction and arrangement of primary and secondary batteries and induction coil and chemicals.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience. .2 approved laboratory equipment training	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations

Function: Maintenance and repair

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Use appropriate tools for repair operations typically performed on vessels	.1 Characteristics and limitations of materials used in construction and repair of vessels and equipment .2 Characteristics and limitations of processes used for construction and repair .3 Properties and parameters considered in the and repair of systems and components .4 Application of safe working practices in the workshop environment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Identification of important parameters for typical vessel related components is appropriate. Selection of material is appropriate. Use of equipment and machine tools is appropriate and safe
Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment	Design characteristics and selection of materials in construction of equipment. Interpretation of machinery drawings and handbooks. Knowledge of the rudiment of projections and be able to make a dimensioned working drawing of simple parts. Operational characteristics of equipment and systems Methods for carrying out safe emergency/temporary repairs. Use of various types of sealants and packing.	Assessment of evidence obtained from one or more of the following: .1 approved workshop skill training .2 approved practical experience and tests	Safety procedures followed are appropriate. Selection of tools and spare gear is appropriate. Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice. Re-commissioning and performance testing is in accordance with manuals and good practice

Maintain marine engineering systems including control systems	*Knowledge of :* *.1 Safety and emergency procedures.* *.2* Safe isolation of electrical and other types of plant. .3 overhauling of engine. .4 valve and injector setting of engine. .5 replacing liner and head of engines. .6 repair of spring or level loaded safety and relief valves, .7 Understands wear and tear	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Isolation, dismantling and reassembly of plant and equipment is in accordance with accepted practices and procedures. Action taken leads to the restoration of plant by the method most suitable and appropriate to the prevailing circumstances and
	of machinery. .8 consumption of spares and stores. .9 Interpretation of piping, hydraulic and pneumatic diagrams		conditions.

Function: Controlling the operation of the vessel and care for persons on board

Column 1	**Column 2**	**Column 3**	**Column 4**
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment* - Knowledge of the precautions to be taken to prevent pollution of the marine environment. Anti-pollution procedures and operation of all associated equipments	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring onboard operations and ensuring compliance with local requirements are fully observed.

Prevent, control and fight fires on board	*Fire prevention and firefighting appliances* – Knowledge of fire prevention and classes and chemistry of fire. Ability to organize fire drills. Knowledge of fire-fighting systems and action to be taken in the event of fire, including fires involving oil and chemical systems	Assessment of evidence obtained from approved fire-fighting training and experience	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans. Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly. The order of priority, and the levels and time -scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem
Maintain seaworthiness of the vessel	*Vessel stability* – Working knowledge of factors affecting stability and trim. Understanding of the fundamentals of watertight integrity' Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy. *Vessel construction* – General knowledge of the principal structural members of a vessel and the proper names for the various parts . Construction of the internal combustion engines. Construction of air compressors, gas producers, steering engines, electric light engines, dynamos, electric motor, refrigerating, hydraulic and other auxiliary machinery on board. Construction of auxiliary steam boiler and chemicals.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved laboratory equipment training	Actions to ensure and maintain the watertight integrity of the vessel are in accordance with accepted practice .

Operate lifesaving appliances	*Life-saving*- Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching .Knowledge of survival at sea techniques	Assessment of evidence obtained from approved training and experience	Actions in responding to abandon ship and survival situations are and conditions and comply with accepted safety practices and standards.
Apply medical first aid on board	*Medical aid* Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board	Assessment of evidence obtained from approved training	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life.
Monitor and control compliance with legislative requirements and measures to ensure safety of life and the protection of the marine environment	Knowledge of the Regulations and other relevant legislation	Examination and assessment of evidence obtained from approved in-service experience	Procedures for monitoring operations and maintenance comply with legislative requirements. Potential noncompliance is promptly and fully identified. Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment

Engine Competency Tables

Table -III/4

Specification of minimum standard of competence for Engine Watch Rating
Function: Marine Engineering

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Carry out a watch routine appropriate to the duties of a rating forming part of an engine-room watch Understand orders and be understood in matters relevant to watchkeeping duties	Terms used in machinery spaces and names of machinery and equipment Engine-room watchkeeping procedures Safe working practices as related to engineroom operations Basic environmental protection procedures Use of appropriate internal communication system Engine-room alarm systems and ability to distinguish between the various alarms, with special reference to fireextinguishing gas alarms	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience; Or .2 practical test	Communications are clear and concise and advice or clarification is sought from the officer of the watch where watch information or instructions are not clearly understood Maintenance, handover and relief of the watch is in conformity with accepted principles and procedures
Operate emergency equipment and apply emergency procedures	Knowledge of emergency duties Escape routes from machinery spaces Familiarity with the location and use of fire-fighting equipment in the machinery spaces	Assessment of evidence obtained from demonstration and approved in-service experience	Initial action on becoming aware of an emergency or abnormal situation conforms with established procedures Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner

CHAPTER IV

Radio communication and radio operators

IV/1
Application

1 The provisions of this chapter apply to radio operators on inland vessels operating in the inland water.

2 Radio operators on inland vessels are, required to comply with the Radio Regulations. The Administration shall ensure that the appropriate certificates as prescribed by the Radio Regulations are issued to or recognized in respect of such radio operators.

IV/2
Mandatory minimum requirements for radio operators

1 Every person in charge of or performing radio duties on an inland vessel shall have completed approved education and training and meet the standard of competence specified in Tables IV/1-2.

Table -IV/1

Specification of minimum standard of competence radio operators

Function: Radiocommunications for Master Class 3

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Transmit and receive information using VHF	Knowledge of: .1 search and rescue communications, .2 ship reporting systems .3 Standard Marine Communication Phrases	Examination and assessment of evidence obtained from practical demonstration of operational procedures, using approved VHF	Transmission and reception of communications are carried out efficiently and effectively.
Provide radio services in emergencies	The provision of radio services in emergencies such as: .1 abandon ship .2 fire on board ship	Examination and assessment of evidence obtained from practical demonstration of operational procedures, using VHF.	Response is carried out efficiently and effectively

Table -IV/2

Specification of minimum standard of competence radio operators

Function: Radiocommunications for Master Class 1 & Class 2 level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Transmit and receive information using VHF/MF subsystems , EPIRB, SART and AIS Class "B"	Knowledge of: .1 search and rescue communications, .2 the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts .3 ship reporting systems .4 radio medical services .5 use of the International Code of Signals and the IMO Standard Marine Communication Phrases	Examination and assessment of evidence obtained from practical demonstration of operational procedures, using: .1 approved equipment .2 radiocommunication VHF/MF, EPIRB. SART and AIS Class "B"	Transmission and reception of communications are carried out efficiently and effectively English language messages relevant to the safety of the ship and persons on board and protection of the marine environment are correctly handled
Provide radio services in emergencies	The provision of radio services in emergencies such as: .1 abandon ship .2 fire on board ship	Examination and assessment of evidence obtained from practical demonstration of operational procedures, using: approved equipment VHF, SART and EPIRB	Response is carried out efficiently and effectively

CHAPTER V

Standards regarding special training requirements for personnel on certain types of ships V/1

Mandatory minimum requirements for the training and qualifications of masters, engineers and ratings on IV oil and chemical tankers

1 Masters, engineers and ratings assigned specific duties and responsibilities related to cargo or cargo equipment on oil and chemical tankers shall hold a certificate in basic training for oil and chemical tanker cargo operations.

2 Every candidate for a certificate in basic training for oil and chemical tanker cargo operations shall have completed an approved basic training for oil and chemical tanker cargo operations and meet the standard of competence specified in Table V/1-1

3 Administrations shall ensure that a certificate of proficiency is issued to IV personnel who are qualified in accordance with paragraph 2, or that an existing certificate of competency or certificate of proficiency is duly endorsed.

V/2

Mandatory minimum requirements for the training and qualifications of masters, engineers, ratings and other personnel on IV passenger ships

1 This regulation applies to masters, engineers, ratings and other personnel serving on board IV passenger vessels engaged on inland waterways.

2 Prior to being assigned shipboard duties on board IV passenger vessels, IV personnel shall have completed the training required in accordance with their capacity, duties and responsibilities.

3 IV personnel who are required to be trained to manage the passenger on Inland Vessels shall, undertake appropriate training or be required to provide evidence of having achieved the required standard of competence specified in Table V/1-2.

4 Administrations shall ensure that documentary evidence of the training which has been completed is issued to every person found qualified under the provisions of this regulation.

Table -V/1

Specification of minimum standard of competence in basic training for IV Oil and chemical Tanker cargo operations

Column	Column	Column	Column
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Contribute to the safe cargo operation of oil and chemical tankers	Basic knowledge of general arrangement and construction of oil and chemical tanker. Basic knowledge of cargo operations: .1 piping systems and valves .2 cargo pumps .3 loading and unloading . .4 tank cleaning and gas-freeing . Basic knowledge of types of electrostatic charge generation. Knowledge and understanding of tanker safety culture and safety management.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training .4 approved training programme	Communications within the area of responsibility are clear and effective. Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations.
Take precautions to prevent hazards	Basic knowledge of the hazards associated with tanker operations, including: .1 health hazards .2 environmental hazards .3 reactivity hazards .4 corrosion hazards .5 explosion and flammability hazards .6 sources of ignition, including electrostatic hazards .7 toxicity hazards .8 vapour leaks and clouds Basic knowledge of hazard controls: .1 water padding, .2 anti-static measures .3 atmospheric control	Examination and assessment of evidence obtained from one or more of the following: .1 approved inservice experience .2 approved training ship experience .3 approved simulator training .4 approved training programme	Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures. Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best practice.

	.4 gas testing Understanding of information on a Material Safety Data Sheet (MSDS)		
Apply occupational health and safety precautions and measures	Function and proper use of gas-measuring instruments and similar equipment Proper use of safety equipment and protective devices, including: .1 breathing apparatus .2 protective clothing and equipment .3 resuscitators .4 rescue and escape equipment Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to oil and chemical tanker , including: .1 precautions to be taken when entering enclosed spaces .2 precautions to be taken before and during repair and maintenance work .3 safety measures for hot and cold work .4 electrical safety .5 ship/shore safety checklist. Basic knowledge of first aid with reference to a Material Safety Data Sheet (MSDS)	Examination and assessment of evidence obtai from one or more the following: .1 approved in-service experienc approved trair ship experience .3 appro simulator training approved trair programme	Procedures for entry into enclosed spaces are observed. Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times. Appropriate safety and protective equipment is correctly used. First aid do's and don'ts

Take precautions to prevent pollution of the environment from the release of oil and chemical.	Basic knowledge of the effects of oil and chemical pollution on human and marine life. Basic knowledge of shipboard procedures to prevent pollution. Basic knowledge of measures	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training	Procedures designed to safeguard the environment are observed at all times
	to be taken in the event of spillage, including the need to: .1 report relevant information to the responsible persons .2 assist in implementing on board spill-containment procedures	ship experience .3 approved simulator training .4 approved training programme	
Carry out fire-fighting operations	Tanker fire response organization and actions to be taken. Fire hazards associated with cargo handling and transportation of oil and chemical. Fire fighting agents used to extinguish oil and chemical fire. Spill containment in relation to fire fighting operation.	Practical exercised and instructions conducted under approved and truly realistic training conditions (e.g., simulated shipboard conditions)	Initial actions and follow-up actions on becoming aware of fire on board conform with established practices and procedures. Action taken on identifying muster signal is appropriate to the indicated emergency and complies with established procedures. The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions.
Respond to emergencies	Basic knowledge of emergency procedures	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved simulator training .3 approved training programme	The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans

Table -V/2

Specification of minimum standard of competence in crisis management and human behaviour

Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Organize shipboard emergency procedures	Knowledge of: .1 the general design and layout of the ship .2 safety regulations .3 emergency plans and procedures. The importance of the principles for the development of shipspecific emergency procedures.	Assessment of evidence obtained from approved training, exercises with one or more prepared emergency plans and practical demonstration	The shipboard emergency procedures ensure a state of readiness to respond to emergency situations
Optimize the use of resources	Ability to optimize the use of resources to make full use of personnel and equipment immediately available and, if necessary, to improvise. Ability to organize realistic drills to maintain a state of readiness.	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Contingency plans optimize the use of available resources Allocation of tasks and responsibilities reflects the known competence of individuals. Roles and responsibilities of teams and individuals are clearly defined
Control response to emergencies	Ability to make an initial assessment and provide an effective response to emergency situations. *Leadership skills* Ability to lead and direct others in emergency situations.	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Procedures and actions are in accordance with established principles and plans for crisis management on board.

Control passengers and other personnel during emergency situations	Ability to control in emergency situations, including: .1 awareness of the general reaction of passengers in emergency situations, including the possibility that: .1.1 generally it takes some time before people accept the fact that there is an emergency situation	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Actions of crew members contribute to maintaining order and control
	.1.2 some people may panic and they may not be as responsive to instructions .2 awareness that passengers and other personnel may, start looking for relatives, friends and/or their belongings as a first reaction		

CHAPTER VI

Emergency, occupational safety, security, medical care and survival functions

VI/1

Mandatory minimum requirements for safety familiarization, basic training and instruction for all IV personnel

1 IV personnel shall receive safety familiarization and basic training or instruction in accordance with IV STCW Rules and shall meet the appropriate standard of competence specified therein.

2 Where basic training is not included in the qualification for the certificate to be issued, a certificate of proficiency shall be issued, indicating that the holder has attended the course in basic training.

VI/2
Mandatory minimum requirements for security-related training and instruction for all IV personnel

1 IV personnel shall receive security-related familiarization and security-awareness training.

2 Security awareness shall be included in the qualification for the certificate to be issued.

Table -VI/1-1

Specification of minimum standard of competence in personal survival techniques

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Survive at sea in the event of vessel abandonment	Types of emergency situations which may occur, such as collision, fire, foundering. Types of life-saving appliances normally carried on ships Equipment in survival craft Location of personal life-saving appliances . Principles concerning survival, including: .1 value of training and drills .2 personal protective clothing and equipment, .3 need to be ready for any emergency .4 actions to be taken when called to survival craft stations .5 actions to be taken when required to abandon ship .6 actions to be taken when in the water .7 actions to be taken when aboard a survival craft, .8 main dangers to survivors	Assessment of evidence obtained from approved instruction or during attendance at an approved course or approved in-service experience and examination, including practical demonstration of competence to: .1 don a lifejacket .2 safely jump from a height into the water .3 right an inverted liferaft while wearing a lifejacket .4 swim while wearing a lifejacket .5 keep afloat without a lifejacket .6 board a survival craft from the ship and water while wearing a lifejacket .7 take initial actions on boarding survival craft to enhance chance of survival .8 stream a drogue or sea-anchor .10 operate survival craft equipment .11 operate location devices, including radio equipment	Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures. The timing and sequence of individual actions are appropriate to the prevailing circumstance and conditions and minimize potential dangers and threats to survival. Method of boarding survival craft is appropriate and avoids dangers to other survivors. Initial actions after leaving the vessel and procedures and actions in water minimize threats to survival.

Table -VI/1-2

Specification of minimum standard of competence in fire prevention and fire fighting

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Minimize the risk of fire and maintain a state of readiness to respond to emergency situations involving fire	Shipboard firefighting organization. Location of firefighting appliances and emergency escape routes. The elements of fire and explosion (the fire triangle). Types and sources of ignition. Flammable materials, fire hazards and spread of fire. The need for constant vigilance. Fire and smoke detection and automatic alarm systems. Classification of fire and applicable extinguishing agents.	Assessment of evidence obtained from approved instruction or attendance at an approved course	Initial actions on becoming aware of an emergency conform with accepted practices and procedures. Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures
Fight and extinguish fires	Fire-fighting equipment and its location on board Instruction in: .1 fixed installations .2 fire-fighter's outfits .3 personal equipment .4 fire-fighting appliances and equipment .5 fire-fighting methods .6 fire-fighting agents .7 fire-fighting procedures, .8 use of breathing apparatus for fighting fires and effecting rescues	Assessment of evidence obtained from approved instruction or during attendance at an approved course, including practical demonstration in spaces which provide truly realistic training conditions (e.g., simulated shipboard conditions) and, whenever possible and practical, in darkness, of the ability to: .1 use various types of portable fire extinguishers .2 use self-contained breathing apparatus, .3 extinguish smaller fires, e.g., electrical fires, oil and chemical fires, propane fires .4 extinguish extensive fires with water, using jet and spray nozzles	Clothing and equipment are appropriate to the nature of the firefighting operations. The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions. Extinguishment of fire is achieved using appropriate procedures, techniques and firefighting agents.

		.5 extinguish fires with foam, powder or any other suitable chemical agent .6 fight fire in smoke-filled enclosed spaces wearing self-contained breathing apparatus .7 extinguish fire with water fog or any other suitable fire-fighting agent in an accommodation room or simulated engine-room with fire and heavy smoke .8 extinguish oil and chemical fire with fog applicator and spray nozzles, dry chemical powder or foam applicators .9 effect a rescue in a smoke-filled space wearing breathing apparatus	

Table -VI/1-3

Specification of minimum standard of competence in elementary first aid

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Take immediate action upon encountering an accident or other medical emergency	Assessment of needs of casualties and threats to own safety. Appreciation of body structure and functions. Understanding of immediate measures to be taken in cases of emergency, including the ability to: .1 position casualty .2 apply resuscitation techniques .3 control bleeding .4 apply appropriate measures of basic shock management .5 apply appropriate measures in event of burns and scalds, including accidents caused by electric current .6 rescue and transport a casualty .7 improvise bandages and use materials in the emergency kit	Assessment of evidence obtained from approved instruction or during attendance at an approved course	The manner and timing of raising the alarm is appropriate to the circumstances of the accident or medical emergency. The identification of probable cause, nature and extent of injuries is prompt and complete and the priority and sequence of actions is proportional to any potential threat to life. Risk of further harm to self and casualty is minimized at all times

Table -VI/1-4

Specification of minimum standard of competence in personal safety and social responsibilities

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Comply with emergency procedures	Types of emergency which may occur, such as collision, fire, foundering Knowledge of shipboard contingency plans for response to emergencies Emergency signals and specific duties allocated to crew members in the muster list; muster stations; correct use of personal safety equipment Action to take on discovering potential emergency, including fire, collision, foundering and ingress of water into the ship Action to take on hearing emergency alarm signals Value of training and drills Knowledge of escape routes and internal communication and alarm systems	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Initial action on becoming aware of an emergency conforms to established emergency response procedures Information given on raising alarm is prompt, accurate, complete and clear
Take precautions to prevent pollution of the marine environment	Basic knowledge of the impact of shipping on the marine environment and the effects of operational or accidental pollution on it Basic environmental protection procedures Basic knowledge of complexity and diversity of the marine environment	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Organizational procedures designed to safeguard the marine environment are observed at all times
Observe safe working practices	Importance of adhering to safe working practices at all times. Safety and protective devices available to protect against potential hazards on board. Precautions to be taken prior to entering enclosed spaces. Familiarization with measures concerning	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Safe working practices are observed and appropriate safety and protective equipment is correctly used at all times.
	accidents prevention and occupational health.		

Contribute to effective communications on board	Understand the principles of , and barriers to , effective communication between individuals and teams. Ability to establish and maintain effective communications.	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Communications are clear and effective at all times.
Contribute to effective human relationships on board	Importance of maintaining good human and working relationships on board. Basic team working principles and practice. Social responsibilities; employment conditions; individual rights and obligations; dangers of drug and alcohol abuse	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Expected standards of work and behaviour are observed at all times.
	Importance of necessary rest. Effects of sleep, schedules, and the circadian rhythm on fatigue. Effects of environmental stressors in and outside the vessel	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Fatigue management practices are observed and appropriate actions are used at all times.

CHAPTER VII

Alternative certification

At present there is no need to have provisions for alternative certification in Inland Waterways Sector.

CHAPTER VIII

Watchkeeping

Regulation VIII/1 *Fitness for duty*

1 Each Administration shall, for the purpose of preventing fatigue:

.1 establish and enforce rest periods for watchkeeping personnel and those whose duties involve designated safety, prevention of pollution and security duties in accordance with the provisions of section VIII/1 of the IV STCW Rules; and

.2 require that watch systems are so arranged that the efficiency of all watchkeeping personnel is not impaired by fatigue and that duties are so organized that the first watch at the commencement of a voyage and subsequent relieving watches are sufficiently rested and otherwise fit for duty.

2 Each Administration shall, for the purpose of preventing drug and alcohol abuse, ensure that adequate measures are established.

Regulation VIII/2
Watchkeeping arrangements and principles to be observed

1 Administrations shall direct the attention of companies, masters, chief engineer officers and all watchkeeping personnel to the requirements, principles and guidance set out in the STCW Code which shall be observed to ensure that a safe continuous watch or watches appropriate to the prevailing circumstances and conditions are maintained in all inland vessels at all times.

2 Administrations shall require the master of every inland vessel to ensure that watchkeeping arrangements are adequate for maintaining a safe watch or watches, taking into account the prevailing circumstances and conditions and that, under the master's general direction:

.1 officers in charge of the navigational watch are responsible for navigating the vessel safely during their periods of duty, when they shall be physically present on the navigating bridge at all times;

.2 officers in charge of an engineering watch, as defined in the IV STCW rules, under the direction of the chief engineer officer, shall be immediately available and on call to attend the machinery spaces and, when required, shall be physically present in the machinery space during their periods of responsibility;

.3 an appropriate and effective watch or watches are maintained for the purpose of safety at all times while the ship is at anchor or moored and, if the ship is carrying hazardous cargo, the organization of such watch or watches takes full account of the nature, quantity, packing and stowage of the hazardous cargo and of any special conditions prevailing

on board, afloat or ashore; and

.4 as applicable, an appropriate and effective watch or watches are maintain for the purposes of security.

Chapter IX

MINIMUM CREW / MANNING ON INLAND VESSELS

IX/ 1 Presently Maritime Boards have stipulated Inland Vessel manning based on Inland Vessel Act provisions and have made it a function of vessel BHP.

IX/2 As per the existing rules every Inland Vessel having passenger capacity of more than 25 numbers shall be in-charge of a Master and also shall have a minimum of two Deck Ratings possessing competency certificate issued as per these rules. [Kerala Inland Vessels Rules 2010]

IX/3 As per the existing rules every mechanically propelled vessel shall have on board the following crew when proceeding on any voyage, namely:-

IX/3.1 For vessels having inboard engines with 565BHP(425 kW) or more

(a) One Master possessing a First Class Master's Certificate granted under the I.V.Act or master's certificate issued under Merchant Shipping Act, 1958.

(b) One Engineer possessing Engineer's Certificate granted under the I.V. Act.

(c) Two Deck Ratings possessing competency certificate issued as per these rules.

(d) One Engine Rating possessing competency certificate issued as per these rules.

IX/3.2 For vessels having inboard engines with 226BHP(170 kW) or more but less than 565BHP(425 kW).

(a) One Master possessing a second class master's Certificate granted under the I.V. Act;

(b) One Engineer possessing first class Engine Drivers certificate issued under the I.V.Act.

(c) Two Deck Ratings possessing competency certificate issued as per these rules.

(d) One Engine Rating possessing competency certificate issued as per these rules.

IX/3.3 For vessels having inboard engines of less than 226BHP(170 kW) a)

One Master possessing a Serang certificate issued under the I.V.Act.

(b) One Engineer possessing Second Cass Engine Drivers certificate issued under the I.V.Act.

(c) One Deck Rating possessing competency certificate issued as per these rules.

IX/3.4 For vessels having inboard engines of less than 113BHP(85 kW)

(a)) One Master possessing a Serang certificate issued under the I.V. Act;

(b) One Engineer possessing Second Class Engine Drivers Certificate issued under the I.V. Act.

IX/3.5 For vessels having inboard engine less than 75 BHP(56 kW)

a) One Master possessing a Serangs certificate issued under the I.V.Act;

(b) One Engineer possessing Second Class Engine Drivers Certificate issued under the I.V.Act.

Comment – While this approach was relevant in the colonial past of early 1900, it is no longer suffices to do manning on other than competence and objective of vessel operation. The later today is quite different from 1900.

Modern approach to manning Inland Vessel should also be as per principles of safe manning and size, type and trade of the vessel.

Recommended manning –

Table-IX/1

Deck Department

Gross Tonnage	**Master (I/C)**	**Mate(2nd I/C)**	**Watchkeeper**
Less than 250 GT	Master Class 3	Deck Watch Rating	------
>250-500 GT	Master Class 2	Deck Watch Rating	-------
More than 500 – 1600	Master Class 1	Master Class 3	Deck Watch Rating
More than 1600 GT-3000 GT	Master Class 1	Master Class 2	Master Class 3

Table-IX/2

Engine Department

Kilo Watt	**Engineer(I/C)**	**2nd Engineer (2nd I/C)**	**Watchkeeper**
Less than 200kW	Engineer Class 3	Engine Watch Rating	------
200 – 350 kW	Engineer Class 3	Engine Watch Rating	Engine Watch Rating
More than 350 – 750kW	Engineer Class 2	Engineer Class 3	Engine Watch Rating
More Than 750kW	Engineer Class 1	Engineer Class 2	Engineer Class 3

Chapter X
Inland Vessel Deck and Engine Syllabus

Table – X/1Syllabus for Master Class III of an Inland Water Vessel (Duration – Two Months)

Function: Navigation

Sr. No.	Topic	Theory Hours	Practical Hours
1	General Section: Fundamental Units, Work, Force, Power, Heat & Temperatures, Areas, Volume, displacement, Dead weight, Light weight, Ship's general Terms, Density, & Specific gravity, Friction	8	
1	Bridge Equipment –Steering system on Inland vessels. Rod and chain system, electro hydraulic system, hand hydraulic system, fully electric system, HRP and jet systems. Use and errors of magnetic compass and Gyro Compass.	8 hrs	16 hrs
2	Knowledge of River routes, shoals and prominent navigation marks in the rivers and navigational waterways of the state	15	
3	Knowledge of aids to navigation in the rivers and navigational waterways of the state	10	
4	Local marks indicating channels. Cross marks, single and double marks ashore. Circular marks, single and double marks ashore. Lights at river crossings.	6 hrs	
5	Watchkeeping - Navigation in restricted waters, like rivers. Navigation in rivers with and without tidal waters. Navigation near barrages, dams and canals. Navigation under bridges, air draft. Seasonal variations in natures of rivers. Knowledge of buoys, lights, land marks, channel marks. Recognition of deep water channels and shoals, shifting of shoals, convex and concave bank of rivers, flow of river current and its strength. Rate and & set of tides. Spring and neap tides. Bore tides. Lights and shapes exhibited by dredgers.	35 hrs	20 hrs

6	Knowledge of writing log books and weather reports	6 hrs	6 hrs
7	Knowledge of seasons and general weather throughout the year in the area of operation.	6 hrs	
8	Emergency procedures - Precautions for the protection	12 hrs	
	and safety of passengers in emergency situations. Initial assessment of damage and damage control. Action to be taken following a collision /grounding. Action to be taken on engine / steering failure. Rescuing persons from the water		
9	Storm, Distress and Emergency signal.	6 hrs	
10	Vessel manoeuvring and handling in rivers and channels. Turning circles and stopping distances. Turning an Inland Vessel in a tideway. Turning a vessel short round. Navigation with stern tow. Navigation with side tow. Navigation with push tow. Procedures to bring the vessel to an anchor and get underway. Procedure to bring her to jetty, pier or wharf and casting off.	22 hrs	
11	Job hazard analysis and risk assessment	2 hrs	
Total		**182 hrs**	

Function: Cargo Handling and stowage

Sr.No.	**Topic**	**Theory Hours**	**Practical Hours**
1	**5.** Cargo handling, stowage and securing- Knowledge of safe handling, stowage and securing of cargo. Care during the voyage and unloading of cargoes cargoes including liquid cargo. **6.** Importance of ventilation during voyage. **7.** Types of hatches & their operations. **8.** Transfer of cargo…Bunkering operations etc.	12 hrs	12 hrs
2	Hazards associated with commonly carried cargoes and precautions to be observed in such cargo carriage	14	
	Total	38 hrs	

Function: communications

Sr.No.	Topic	Theory Hours	Practical Hours
1	Communication with shore radio stations and other vessels using VHF.	3 hrs	3 hrs
2	Operation of EPIRB and SART during emergency	2 hrs	2 hrs
	Total	10 hrs	

Function -Controlling the operation of the vessel and care for persons on board

Sr.No.	Topic	Theory Hours	Practical Hours
1	Inland Vessel Act - Main provisions of Inland Vessel Act. Registration of Inland Vessel. Survey of Inland Vessels. Registration of barges.	16 hrs	
2	Rules & notification issued under Inland Vessel Act.	10 hrs	
3	Port Rules - Basic knowledge of rules of the ports in the state. Operation of Inland vessels within port limit, compliance with port rules and penalties.	8 hrs	
4	IWAI Act 1985.	6 hrs	
5	Knowledge of Stability of vessel and effect of grounding	8 hrs	
6	General Knowledge about ISPS, suspicious activities of another vessel in the vicinity.	6 hrs	
Total		84 hrs	

Grand total: 314 hrs

Table – X/2 Syllabus for Master Class 2 of an Inland Water Vessel

(Duration – Two Months)

Function: Navigation

Sr.No.	Topic	Theory Hours	Practical Hours
1	Bridge Equipment – Operation and errors of GPS, RADAR, and Echo sounder. Knowledge of steering system on Inland vessels. Knowledge of the use and errors of magnetic compass.	**20 hrs**	**12 hrs**
2	Plotting vessels position by using landmarks, aids to navigation, including lighthouses, beacons and buoys, depth contour, dead reckoning, taking into account the effects of winds, bore tides, currents and estimated speed.	**20 hrs**	**20 hrs**
3	Charts & Publications - Knowledge of and ability to use Inland Water and river navigation chart, river atlas, river pilots, tide tables, river notices. Knowledge of tide, range and timings. Knowledge of buoyage system.	**24 hrs**	
4	Ability to interpret and apply the meteorological information available.	**6 hrs**	
5	Knowledge of seasons and general weather throughout the year in the area of operation.	**6 hrs**	

6	Watchkeeping -Thorough knowledge of content, application and intent of the Rules of the Road.Knowledge of principles to be observed in keeping a navigational watch. Knowledge of taking and handing over watch.Knowledge of navigation near barrages, dams, canals and rivers. Knowledge of writing of log books and weather reports.	**20 hrs**	
7	**1.** Emergencies - Knowledge of Storm, Distress and Emergency signal. Knowledge of Safety of passengers, Rescuing persons from the water. Actions to be taken on engine breakdown, steering failure, collision, grounding. Assessment of damage and damage control. Management of inland vessel under tow or when towed or pushing.	**12 hrs**	
8	Vessel manoeuvring - Knowledge of Vessel manoeuvring and handling in rivers and channels.	**10 hrs**	
	Effect of draught, trim, speed and, under keel clearance on turning circles and stopping distances. Turning a vessel short round. Procedures to bring the vessel to an anchor and get underway. Procedure to bring her to jetty, pier or wharf and casting off.		
9	Job hazard analysis and risk assessment	2 hrs	
Total		**152 hrs**	

Function – Cargo Handling and stowage

Sr. No.	**Topic**	**Theory Hours**	**Practical Hours**
1	Cargo work**-** safe handling, stowage and securing of cargo. Effect of cargo on seaworthiness and stability of the vessel.	**10 hrs**	**10 hrs**
2	Hazards associated with commonly carried cargoes and precautions to be observed in such cargo carriage	10	
3	The damages and defects due to loading and unloading operations, severe weather conditions, and corrosion	**8 hrs**	
4	Cargo Ventilation and Hatch arrangements.	**12**	

Total	**50 hrs**

Function –Communications

Sr.No.	Topic	Theory Hours	Practical Hours
1	Basic knowledge of local signals.	**3 hrs**	
2	Knowledge of VHF radio operation.	**3 hrs**	**6 hrs**
3	Operation of EPIRB and SART during emergency. Reporting procedures and system.	2 hrs	2 hrs
4	Operation of AIS Class “B”	4	4
Total		**24 hrs**	

Function -Controlling the operation of the vessel and care for persons on Board

Sr.No.	Topic	Theory Hours	Practical Hours
1	Prevention of pollution of the marine environment. Knowledge of anti-pollution procedures and use of associated equipment.	**10 hrs**	**6 hrs**
2	Vessel stability - Working knowledge of factors that affect stability and trim. Shift of metacenter by adding/removing load. Actions to be taken in the event of partial loss of intact buoyancy. Fundamentals of watertight integrity.	**24 hrs**	
3	Vessel construction - General knowledge of the principal structural members of an inland vessel and the proper names for the various parts.	**12 hrs**	
4	Knowledge of the provisions of the Inland Vessel Act 1917 and rules framed thereunder, Port rules, and IWAI rules.	**12 hrs**	

5	Knowledge of relevant DGS and Maritime Boards notices.	**12 hrs**	
6	Knowledge of national legislation related to personnel matters.	**12 hrs**	
7	Knowledge of Certificates and other documents required to be carried by the vessel.	**6 hrs**	
8	Onboard personnel management and training. Task and workload management.	**6 hrs**	
Total		**100 hrs**	

Grand Total : 318 hrs

Table – X/3 Syllabus for Master Class 1 of an Inland Water Vessel (Duration – Two Months)

Function: Navigation

Sr.No.	Topic	Theory Hours	Practical Hours
1	Bridge Equipment – Operation and errors of equipment such as GPS, Echo Sounder, RADAR and ECDIS commonly fitted on board the vessels concerned.	**24 hrs**	
2	Inland water chart, river atlas, river pilots, tide tables, river notices.	**12 hrs**	**12 hrs**

3	Plotting vessels position by using landmarks, aids to navigation, including lighthouses, beacons and buoys, depth contour, dead reckoning, taking into account the effects of winds, bore tides, currents and estimated speed.	**10 hrs**	**8 hrs**
4	Steering system on Inland vessels.	**6 hrs**	
5	Operation of magnetic and gyro compasses. Determine compass error using terrestrial objects.	**6 hrs**	
6	*Meteorology* - Ability to interpret and apply the meteorological information available. Knowledge of seasons and general weather throughout the year in the area of operation.	**6 hrs**	
7	*Watchkeeping* - Content, application and intent of the Rules of the Road. Principles to be observed in keeping a navigational watch. Navigation near barrages, dams, canals and rivers. Knowledge of tide, range and timings. Knowledge of buoyage system. Knowledge of writing of log books and weather reports.	**14 hrs**	**4 hrs**
8	Respond to emergencies - protection and safety of passengers in emergency. Initial assessment of damage and damage control. Action to be taken following a collision / grounding. Management of inland vessel under tow. Action to be taken on engine / steering failure. Rescuing persons from the water. Action to be taken when emergencies arise at port. Distress and Emergency signal.	**20 hrs**	
9	Vessel *manoeuvring and handling* - Effect of dwt,	**22 hrs**	
	draught, trim, speed and, under keel clearance on turning circles and stopping distances. Turning a vessel short round. Bringing the vessel to an anchor and get underway. Bringing her to jetty, pier or wharf and casting off. Safe beaching of vessel.		
10	Job hazard analysis and risk assessment	2 hrs	
Total		**146 hrs**	

Function – Cargo Handling and stowage

Sr.No.	Topic	Theory Hours	Practical Hours

1	Cargo handling, stowage and securing. Care of cargo during the voyage. Effect of cargo on seaworthiness and stability of the vessel. Operational and design limitations of inland vessels during the voyage care during the voyage.	**12 hrs**	
2	Hazards associated with commonly carried cargoes and precautions to be observed in such cargo carriage	**8**	
3	Knowledge of carriage of ODC, Petroleum products, Containers and coal	**6**	
4	Defects and damages to cargo spaces, hatch covers and ballast tanks due to loading and unloading operations, corrosion and severe weather conditions	**10**	
Total		**36 hrs**	

Function –Communications

Sr.No.	**Topic**	**Theory Hours**	**Practical Hours**
1	International Code of Signals and local signals.	**15 hrs**	
2	Use of VHF/ MF radio communications	**6 hrs**	**10 hrs**
3	Operation of AIS Class “B”	**4 hrs**	
4	Operation of EPIRB and SART during emergency	**2 hrs**	**2 hrs**
Total		**39 hrs**	

Function -Controlling the operation of the vessel and care for persons on board

Sr.No.	**Topic**	**Theory Hours**	**Practical Hours**
1	Prevention of pollution of the marine environment and anti-pollution procedures.	**12 hrs**	**6 hrs**

2	Vessel stability – displacement, deadweight, trim, list, GM, Centre of buoyancy FWA, load line, Righting lever.	**10 hrs**	
3	Stable, unstable and neutral equilibrium. Working knowledge of factors that affect stability and trim. Fundamentals of watertight integrity, actions to be taken in the event of partial loss of intact buoyancy.	**12 hrs**	
4	Vessel construction - *P*rincipal structural members of inland vessel and proper names for the various parts.	**10 hrs**	
5	Legislative requirements - Provisions of the Inland Vessel Act 1917. Port rules, and IWAI rules. Relevant DG notices /Maritime Boards notices. National legislation related to personnel matters. Certificates and other documents required to be carried by the inland vessel.	**12 hrs**	
5	Knowledge of rules with regards to Prevention and control of pollution and protection of Inland water and coastal area. Knowledge of the provision of section 134, Chapter X,XI & XII of the Motor vehicle act, 1988 (59 0f 1998) as applicable to Inland vessels. Knowledge of Port and custom rules, as applicable to Kolkatta port and transit through Bangladesh.	**8**	
7	Leadership and managerial skills - onboard personnel management and training	**16 hrs**	
Total		**86 hrs**	

Grand Total: 303 hrs

Table – X/4 Syllabus for Deck Watch Rating of an Inland Vessel

(Duration – Two Weeks)

Sr.No.	Topic	Theory Hours	Practical Hours
1	Knowledge of steering a steady course. Understanding of helm orders.	**24 hrs**	

2	Responsibilities of a look-out, including reporting the approximate bearing of a sound signal, light or other object in degrees or points	**12 hrs**	
3	Knowledge of emergency duties and alarm signals.	**8 hrs**	
4	Basic environmental protection procedure.	**6 hrs**	
5	Fire prevention and fire-fighting appliances- Knowledge of classes and chemistry of fire. Knowledge of fire-fighting systems on inland vessels. Understanding of action to be taken in the event of fire, including fires involving oil and chemical systems.	**8 hrs**	
6	Life Saving - knowledge of the operation of survival crafts, their launching appliances and arrangements, and their equipment. Knowledge of survival techniques appropriate to the areas of operation of the vessel.	**10 hrs**	
7	Personal safety and social responsibility.	**6 hrs**	
8	Medical Aid - Ability to provide first aid in the case of accidents that are likely to occur on board.	**6 hrs**	
Total		**80 hrs**	

Table – X/5 Syllabus for Engineer Class 3 of an Inland vessel (Duration - Two Months) Function: Marine Engineering

Sr.No.	Topic	Theory Hours	Practical Hours
	1. General Section: Fundamental Units, Work, Force, Power, Heat & Temperatures, Areas, Volume, displacement, Dead weight, Light weight, Ship's general Terms, Density, & Specific gravity, Friction,		
1	Engineering watch - Principles to be observed in keeping an engineering watch. Taking over and accepting a watch. Routine duties undertaken during a watch. Maintenance of the machinery space log book and the significance of the readings taken. Duties associated with handing over a watch. Changeover of remote/automatic to local control of all systems.	**10 hrs**	**10 hrs**
2	Main and auxiliary machinery and associated control systems. Working of various types of Internal Combustion Engine (applicable limited power). Cycle – Compression, ignition, expansion and exhaust. Spark ignition, hot bulb and compression ignition. Air fuel ratio for good and complete combustion. Requirement of excess air. Use and management of different valves, forks, pipes and connections. Methods of supplying air and fuel to the cylinder. Nature and properties of fuel oil and chemical. Preparation of main and auxiliary machinery for operation. Causes which make the engine difficult to start and remedies. Mechanism of the starting and reversing arrangements. Steering gear systems. Deck machinery.	**14 hrs**	**14 hrs**
3	Air compressors- Application of compressed air for engine starting, pneumatic controls and hydrophores. Air receivers and fittings. Description of compressor parts, single and double stage. Starting, running and stopping procedure. Maintenance of suction and delivery valves.	**8 hrs**	**8 hrs**
4	Lubricating oil and chemical pressure, possible reasons for loss of pressure. Running pressure and fuel trip off pressure. Contamination by fuel, water and failure of filtration. Deterioration in condition and excessive consumption. Requirements for engine cooling. Air-cooled, radiator water- cooled, raw water and fresh water cooled. Corrosion of cooling water	**10 hrs**	

	spaces, protective paints and anodes. Permissible temperature and fuel cut off temperature. Overheating and seizure of engine. Exhaust gas colour and temperature. Diagnosis of fault in operation from exhaust temperature of units. Dry or water cooled exhaust pipes. Importance of proper lagging of exhaust pipes. Local regulations against emission of black smoke		
5	Hydraulics - Hydraulic power pack oil and chemical tank, pump, flow control and direction control valves and motor. Hydraulic symbols and their meaning. Cleanliness of hydraulic oil and chemical for reliable operation. Application of hydraulic machinery in steering gear, main engine clutch control, windlass and deck machinery.	**12 hrs**	**6 hrs**
6	Piping and Pumping system - Routine pumping operations. Operation of bilge and ballast pumping systems. Manually operated reciprocating and semirotary pumps. Suction lift and discharge heads. Power driven pumps e.g. centrifugal, gear, screw and vane pumps. Pump applications for bilge pumping, cooling water, deck main, oil and chemical transfer. Dangers resulting due to leakages from the fuel oil and chemical tanks. Safe bunkering, ballasting and deballasting. Maintenance of machinery including pumps and piping systems.	**10 hrs**	**10 hrs**
7	Checks before starting engine – free to rotate, propeller clear, fuel priming, checks of crank case and gear oil and chemical, cooling water, various starting arrangement viz hand, electrical (battery) and air starting. Idling speed, rpm, temperature and pressure.	**10 hrs**	**4 hrs**
8	Rudder and propeller - Function of rudder. Spade, semi-balanced and balanced rudder. Rudder blade, stock, pintle and tiller, rudder drop, common damages to rudder. Steering gear, chain and rod, hand, hydraulic and electro hydraulic. Rudder angle indicator. Follow up and Non-Follow up operation. Propellers – Pitch and RPM. Fixed and controllable pitch propeller. Fitting of propeller on shaft. Common damages to propeller.	**4 hrs**	**4 hrs**
9	Deck machinery and equipment - Anchors, anchor chain, chain locker, capstan, windlass and deck crane.	**6 hrs**	**8 hrs**

10	Units of measurement - Metric and S.I. Units of length, area, volume, mass, force, energy, power, work,	**4 hrs**	
	temperature, density and viscosity, conversion to common British units.		
11	Job hazard analysis and risk assessment	2 hrs	
Total		**154 hrs**	

Function: Electrical Engineering

Sr.No.	Topic	Theory Hours	Practical Hours
1	Power Generation Plant - Appropriate basic electrical knowledge and skills. Voltage, current, power units. Resistance, inductance, capacitance and simple electric circuit diagram. Symbols in circuit diagram. Battery – Lead Acid, Alkaline and Dry. Meaning of number of plates and cells. Measurement of voltage with multi meter. Electrolyte density. Charging, precautions against overcharging and rapid discharging. Preparing, starting, coupling and changing over alternators or generators. Location of common faults in control system and action to prevent damage.	**15 hrs**	**15 hrs**
2	Use of measuring and test equipment - Construction and operational characteristics of onboard AC and DC electrical systems and equipment. Construction and operation of electrical test and measuring equipment. Safety requirements for working on onboard electrical systems.	**6 hrs**	**4 hrs**
3	Main Switch Board and distribution boards, switches and circuit breakers, overload and no volt trips. Maintenance of contact points. Transformers.	**6 hrs**	**6 hrs**
	Total	**52 hrs**	

Function: Maintenance and repair

Sr.No.	Topic	Theory Hours	Practical Hours
1	Characteristics and limitations of materials used in construction and repair of vessels and equipment.	**4 hrs**	
2	Characteristics and limitations of processes used for construction and repair.	**4 hrs**	

3	Properties and parameters considered in the construction and repair of systems and components.	**3 hrs**	
4	Application of safe working practices in the workshop	**5 hrs**	
	environment.		
5	Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment. Use of scale, callipers, vernier, micrometer and filler gauges. Use of temperature and pressure gauges. Checking errors and calibration.	**3 hrs**	
6	Interpretation of machinery drawings and handbooks.	**8 hrs**	
7	Basic mechanical knowledge and skills of Marine engineering and control systems. Safe isolation of electrical and other types of plant and equipment	**4 hrs**	
8	Undertake overhauling of engine. Running Repair and Adjustments – Cleaning and changing of air, oil and chemical and fuel filters. Adjusting tappet clearances. Renewal of cylinder head gaskets, operation with turbocharger removed. Various parts and their functions of a Marine Diesel Engines. Scavenging, scavenge system & Turbo-charging Exhaust arrangement	**6 hrs**	**8 hrs**
9	Wear and tear of machinery.	**2 hrs**	
10	Light and sound signals - Location, construction and visibility of lights and shapes. Maintenance of lights, whistles, hooters or siren for sound signal	**3 hrs**	**5 hrs**
Total		**65 hrs**	

Function: Controlling the operation of the vessel and care for persons on board

Sr.No.	Topic	Theory Hours	Practical Hours
1	Prevention of pollution of the marine environment. Anti-pollution procedures and all associated equipment.	**6 hrs**	**6 hrs**
2	Fire prevention and fire-fighting. Scavenge fire, Crankcase explosions	**5 hrs**	
3	Vessel stability - factors affecting stability and trim, fundamentals of watertight integrity , actions to be taken in the event of partial loss of intact buoyancy.	**6 hrs**	
4	Vessel construction -General knowledge of the principal structural members of a vessel and the proper names for the various parts.	**10 hrs**	
5	Operation of life-saving appliances onboard.	**5 hrs**	
6			
7	Compliance with relevant regulations.	**5 hrs**	
Total		**48 hrs**	

Grand Total: 320 hrs

Table – X/6 Syllabus for Engineer Class 2 of an Inland vessel (Duration - Two Months)

Function: Marine Engineering

Sr.No.	Topic	Theory Hours	Practical Hours
1	General Section:- To calculate TPI/TPC, Simpson's first rule & second rule. Use of Simpson's rule for calculating area and volume, displacement of vessel at different draft, To calculate Total pressure index in sea water, river water & fresh water.	**4**	**4**
2	Engineering watch - Principles to be observed in keeping an engineering watch. Taking over and accepting a watch. Routine duties undertaken during a watch. Maintenance of the machinery space log book and the significance of the readings taken. Duties associated with handing over a watch. Changeover of remote/automatic to local control of all systems.	**8 hrs**	**6 hrs**
2	Operation of main and auxiliary machinery- Working of various types of Internal Combustion Engine. Cycle – Compression, ignition, expansion and exhaust. Spark ignition, hot bulb and compression ignition. Air fuel ratio for good and complete combustion. Requirement of excess air. Two stroke cycle and four stroke cycle. Timing diagrams for natural aspiration and pressure charging. Checking engine timing with diagram Use and management of different valves, forks, pipes and connections. Various methods of supplying air and fuel to the cylinder. Causes which make the engine difficult to start and remedies. Nature and properties of fuel oil and chemical. Mechanism of the starting and reversing arrangements. Trouble shooting of engines. Shafting installations including propellers. Operation of steering system and deck machinery on inland vessels.	**12 hrs**	**8 hrs**

3	Checks before starting engine – free to rotate, propeller clear, fuel priming, checks of crank case and gear oil and chemical, cooling water, various starting arrangement viz hand, electrical (battery) and air starting. Idling speed, rpm, temperature and pressure.	**5 hrs**	**8 hrs**
4	Air compressors- Application of compressed air for engine starting, pneumatic controls and hydrophores. Air receivers and fittings. Description of compressor parts, single and double stage. Starting, running and stopping procedure. Maintenance of suction and delivery valves.	**8 hrs**	

5	Lubricating oil and chemical pressure, possible reasons for loss of pressure. Running pressure and fuel trip off pressure. Contamination by fuel, water and failure of filtration. Deterioration in condition and excessive consumption. Requirements for engine cooling. Air-cooled, radiator water- cooled, raw water and fresh water cooled. Corrosion of cooling water spaces, protective paints and anodes. Permissible temperature and fuel cut off temperature. Overheating and seizure of engine. Exhaust gas colour and temperature. Diagnosis of fault in operation from exhaust temperature of units. Dry or water cooled exhaust pipes. Importance of proper lagging of exhaust pipes. Local regulations against emission of black smoke.	**6 hrs**	**6 hrs**
6	Hydraulics - Hydraulic power pack oil and chemical tank, pump, flow control and direction control valves and motor. Hydraulic symbols and their meaning. Cleanliness of hydraulic oil and chemical for reliable operation. Application of hydraulic machinery in steering gear, main engine clutch control, windlass and deck machinery.	**7 hrs**	**6 hrs**

7	Piping and Pumping system - Routine pumping operations. Operation of bilge and ballast pumping systems. Manually operated reciprocating and semirotary pumps. Suction lift and discharge heads. Power driven pumps e.g. centrifugal, gear, screw and vane pumps. Pump applications for bilge pumping, cooling water, deck main, oil and chemical transfer. Dangers resulting due to leakages from the fuel oil and chemical tanks. Safe bunkering, ballasting and deballasting. Maintenance of machinery including pumps and piping systems.	**5 hrs**	**4 hrs**
8	Rudder and propeller - Function of rudder. Spade, semi-balanced and balanced rudder. Rudder blade, stock, pintle and tiller, rudder drop, common damages to rudder. Steering gear, chain and rod, hand, hydraulic and electro hydraulic. Rudder angle indicator. Follow up and Non-Follow up operation. Propellers – Pitch and RPM. Fixed and controllable pitch propeller. Fitting of propeller on shaft. Common damages to propeller.	**5 hrs**	**4 hrs**
9	Deck machinery and equipment - Anchors, anchor chain, chain locker, capstan, windlass and deck crane.	**3 hrs**	**4 hrs**
10	Fuel & lubricants - Petrol , high-speed diesel oil and chemical, light diesel oil and chemical. Flash point, ignition temperature, density and viscosity. LPG and CNG. Calorific value.	**4 hrs**	
11	Grease, mineral oil and chemical, synthetic oil and chemical, common grades of crank case oil and chemical, gear oil and chemical and hydraulic oil and chemical. Deterioration of oil and chemical due to use and contamination.	**4 hrs**	
12	Job hazard analysis and risk assessment	2 hrs	
Total		**122 hrs**	

Function: Electrical Engineering

Sr.No.	**Topic**	**Theory Hours**	**Practical Hours**

1	Power Generation Plant - Appropriate basic electrical knowledge and skills. Voltage, current, power units. Resistance, inductance, capacitance and simple electric circuit diagram. Symbols in circuit diagram. Battery – Lead Acid, Alkaline and Dry. Meaning of number of plates and cells. Measurement of voltage with multi meter. Electrolyte density. Charging, precautions against overcharging and rapid discharging. Preparing, starting, coupling and changing over alternators or generators. Location of common faults in control system and action to prevent damage.	**10 hrs**	**10 hrs**
2	Use hand tools, electrical and electronic measuring and test equipment. Safety requirements for working on electrical systems. Construction and operational characteristics of AC and DC electrical systems and equipment. D.C.Dynamo – Main engine driven and auxiliary engine driven. Maintenance – greasing of bearings, commutator cleaning, renewal of carbon brushes and ventilation. D.C.Motors and applications. Alternating current generator – Peak voltage, RMS voltage, frequency, single phase, three phase, automatic voltage regulator. Maintenance of bearings and slip rings. AC motors and application.	**5 hrs**	**5 hrs**
3	Detection of electric malfunction, location of faults and measures to prevent damages. Interpretation of electrical and simple electronic diagrams.	**5 hrs**	**5 hrs**
4	Operate alternators, generators and control systems. Appropriate basic electrical knowledge and skills for	**5 hrs**	**5 hrs**
	preparing, starting, coupling and changing over alternators or generators. Location of common faults and action to prevent damage.		
5	Main Switch Board and distribution boards, switches and circuit breakers, overload and no volt trips. Maintenance of contact points. Transformers.	**8 hrs**	**6 hrs**
6	Control systems: Location of common faults and action to prevent damage	**4 hrs**	
Total		**68 hrs**	

Function: Maintenance and repair

Sr.No.	**Topic**	**Theory Hours**	**Practical Hours**

1	Characteristics and limitations of materials used in construction and repair of vessels and equipment. Names of materials for construction of hull and machinery viz. Wood, steel, aluminium, glass re-enforced plastic, cast iron, mild steel, cast steel, alloy steel, copper, zinc, tin and common alloys. Physical and chemical properties of materials used. Identification of materials from hull drawings and machinery parts lists. Symbols for material names	**3 hrs**	
2	Characteristics and limitations of processes used for construction and repair. Joining and cutting of metals by gas and arc welding. Use of synthetic resin for temporary repair. Riveted, bolted and muff couplings. Soldering and brazing.	**3 hrs**	
3	Properties and parameters considered in the construction and repair of systems and components.	**3 hrs**	
4	Application of safe working practices in the workshop environment.	**3 hrs**	
5	Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment.	**2 hrs**	**3 hrs**
6	Interpretation of machinery drawings and handbooks. Plan, elevation (profile), end view of an object and machinery part, with dimensions. Practice of sketching of simple parts and scale of proportion. Study of parts from drawings in Operation and Maintenance Manuals	**3 hrs**	**5 hrs**
7	Basic mechanical knowledge and skills of Marine engineering and control systems. Safe isolation of	**5 hrs**	
	electrical and other types of plant and equipment		
8	Overhauling of engine. Running Repair and Adjustments – Cleaning and changing of air, oil and chemical and fuel filters. Adjusting tappet clearances. Renewal of cylinder head gaskets, operation with turbocharger removed.	**5 hrs**	**6 hrs**
9	Wear and tear of machinery.	**3 hrs**	
10	Valve and injector setting of engine.	**3 hrs**	**3 hrs**
11	Replacing of liner and head of engines.	**2 hrs**	**5 hrs**

12	Light and sound signals - Location, construction and visibility of lights and shapes. Maintenance of lights, whistles, hooters or siren for sound signal	**2 hrs**	**5 hrs**
13	Fuel, lubricating oil and chemicals and consumable - Estimates of the quantities of fuel oil and chemical and lube oil and chemical for a specific voyage or a fixed number of trips. Consumption on full load and on normal running load, compare fuel oil and chemical and lube oil and chemical consumption with those figures in vessel's trial records. Quantities of grease, hydraulic oil and chemical, filter elements, distilled water and others. Bunkering-Requisition of HSD or LDO and lube oil and chemical quantity and specification. Check sounding of bunker tanks before bunkering and after bunkering. Calculate quantity from tank capacity chart, observe precaution from fire.	**3 hrs**	**4 hrs**
14	Surveys, repairs and dry docking - Preparation of defect list for machinery with reference to running hours, renewals as per manuals, tests and inspections due. List of additional repairs which may be required after opening of machinery, spares in stock and those to be procured. Preparation of least of work to be carried out during dry docking. Reference to readings and data recorded during previous dry docking. Estimates of underwater repairs, inspections, overhauls.	**6 hrs**	
Total		**77 hrs**	

Function: Controlling the operation of the vessel and care for persons on board

Sr.No.	Topic	Theory Hours	Practical Hours
1	Prevention of pollution of the marine environment. Anti-pollution procedures and all associated equipment.	**6 hrs**	**6 hrs**
2	Fire prevention and fire-fighting.	**8 hrs**	

3	Vessel stability - factors affecting stability and trim, fundamentals of watertight integrity , actions to be taken in the event of partial loss of intact buoyancy. Element of Ship construction, Bullhead, Stern arrangement, Fore arrangement. Calculation of KG, KB, LCF, GM.	**8 hrs**	
4	Vessel construction -General knowledge of the principal structural members of a vessel and the proper names for the various parts.	**8 hrs**	
5	Operation of life-saving appliances onboard.	**6 hrs**	
6	Apply medical first aid on board.	**4 hrs**	
7	Compliance with relevant regulations.	**7 hrs**	
Total		**53 hrs**	

Grand Total: 320 hrs

Table – X/7 Syllabus for Engineer Class 1 of an Inland vessel

(Duration - Two Months)

Function: Marine Engineering

Sr.No.	**Topic**	**Theory Hours**	**Practical Hours**

1	Engineering watch - Principles to be observed in keeping an engineering watch. Taking over and accepting a watch. Routine duties undertaken during a watch. Maintenance of the machinery space log book and the significance of the readings taken. Duties associated with handing over a watch. Changeover of remote/automatic to local control of all systems. Diesel engine components – Construction, functions, wear and tear and adjustments of : - Cylinder block, cylinder head, inlet and exhaust valves, piston and rings, cylinder liner, crank shaft, cam shaft, gudgeon pin, connecting rod. Top, bottom and main bearings. Timing chain / gear, fuel pump and fuel injectors, fuel regulators, governor and turbocharger. Measurement of liner wears, fitting of piston rings, bearing clearances and renewal, crank pin ovality and taper, undersized bearings. Crank shaft deflection and alignment, details of foundation chock. Flywheel and power take off.	**20 hrs**	**15 hrs**
2	Operation of main and auxiliary machinery- Various types of Internal Combustion Engine. Timing diagrams for natural aspiration and pressure charging. Checking engine timing with diagram.	**14 hrs**	**10 hrs**
3	Basic Refrigeration and Air conditioning, its operation and maintenance	**5 hrs**	**5 hrs**
3	Use and management of different valves, forks, pipes and connections. Various methods of supplying air and fuel to the cylinder. Construction of the apparatus for carbureting, atomizing or gasifying the fuel, and means for cooling the cylinders, pistons, etc. Preparation of main and auxiliary machinery for operation. Causes which make the engine difficult to start and remedies. Mechanisms of the starting and reversing arrangements. Nature and properties of fuel oil and chemical. Trouble shooting of engines. Calculation of indicator diagrams and understanding action of gas in the cylinder. Shafting - Intermediate and propeller shafts. Flanged and muff couplings. Shaft bearings. Alignment of shafting. Stern tube bearings-cutlass, white metal shaft seal.Checking the fairness of shafting.	**20 hrs**	**15 hrs**
4	Piping and Pumping system – Routine operation and maintenance of machinery including pumps and piping	**6 hrs**	**8 hrs**
	systems. Safe bunkering and ballasting / deballasting. Dangers resulting due to leakages from the fuel oil and chemical tanks.Consumption of oil and chemicals, capacity of tanks. Action of wire gauge diaphragms when placed in pipes and connections to oil and chemical tanks.		
5	Job hazard analysis and risk assessment	2 hrs	

Total	**120 hrs**

Function: Electrical Engineering

Sr.No.	Topic	Theory Hours	Practical Hours
1	Detection of electric malfunction, location of faults and measures to prevent damages. Interpretation of electrical and simple electronic diagrams.	**10 hrs**	**10 hrs**
2	Construction of electric light engines, dynamos, electric motor, etc.	**8 hrs**	
3	Location of common faults and action to prevent damage.	**5 hrs**	**6 hrs**
4	Principal construction and arrangement of primary and secondary batteries and induction coil and chemicals.	**5 hrs**	
Total		**52 hrs**	

Function: Maintenance and repair

Sr.No.	Topic	Theory Hours	Practical Hours
1	Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of onboard plant and equipment. Design characteristics and selection of materials in construction of equipment. Interpretation of machinery drawings and handbooks. Knowledge of the rudiment of projections and be able to make a dimensioned working drawing of simple parts. Operational characteristics of equipment and systems. Methods for carrying out safe emergency/temporary repairs. Use of various types of sealants and packing.	**15**	**10**

2	Marine engineering & controls- *Safety and emergency procedures.* Safe isolation of electrical and other types of plant. Overhauling of engine. Valve and injector setting of engine. Replacing liner and head of engines. Repair of spring or level loaded safety and relief valves. Affect of wear and tear of machinery. Consumption of spares and stores. Interpretation of piping, hydraulic and pneumatic diagrams.	**12 hrs**	**15 hrs**
3	Fuel, lubricating oil and chemicals and consumable - Estimates of the quantities of fuel oil and chemical and lube oil and chemical for a specific voyage or a fixed number of trips. Consumption on full load and on normal running load, compare fuel oil and chemical and lube oil and chemical consumption with those figures in vessel's trial records. Quantities of grease, hydraulic oil and chemical, filter elements, distilled water and others. Bunkering-Requisition of HSD or LDO and lube oil and chemical quantity and specification. Check sounding of bunker tanks before bunkering and after bunkering. Calculate quantity from tank capacity chart, observe precaution from fire.	**8 hrs**	**8 hrs**
4	Surveys, repairs and dry docking - Preparation of defect list for machinery with reference to running hours, renewals as per manuals, tests and inspections due. List of additional repairs which may be required after opening of machinery, spares in stock and those to be procured. Preparation of least of work to be carried out during dry docking. Reference to readings and data recorded during previous dry docking. Estimates of underwater repairs, inspections, overhauls	**10 hrs**	**7 hrs**
Total		**85 hrs**	

Function: Controlling the operation of the vessel and care for persons on board

Sr.No.	Topic	Theory Hours	Practical Hours
1	Prevention of pollution of the marine environment. Anti-pollution procedures and all associated equipment.	**5 hrs**	**4 hrs**
2	Legislative requirements - Provisions of the Inland Vessel Act 1917. Port rules,	**11 hrs**	

	and IWAI rules. Relevant DG notices /Maritime Boards notices. National legislation related to personnel matters. Certificates and other documents required to be carried by the inland vessel.		
3	Leadership and managerial skills - onboard personnel management and training	**7 hrs**	
4	Fire prevention and fire-fighting.	**4 hrs**	**3 hrs**
5	Vessel stability - factors affecting stability and trim, fundamentals of watertight integrity , actions to be taken in the event of partial loss of intact buoyancy. Basic Refrigeration and Air conditioning, its operation and maintenance	**8 hrs**	
6	Vessel construction -General knowledge of the principal structural members of a vessel and the proper names for the various parts. Construction of the internal combustion engines. Construction of air compressors, gas producers, steering engines, electric light engines, dynamos, electric motor, refrigerating, hydraulic and other auxiliary machinery on board. Construction of auxiliary steam boiler and chemicals.	**10 hrs**	
7	Operation of life-saving appliances onboard.	**4 hrs**	
8	Apply medical first aid on board.	**5 hrs**	
Total		**65 hrs**	

Grand total: 321 hrs Table – X/8 Syllabus for Engine Watch Rating of an Inland Vessel (Duration - Two Weeks)

Sr.No.	Topic	Theory Hours	Practical Hours
1	Terms used in machinery spaces and names of machinery and equipment.	**8 hrs**	

2	Engine-room watchkeeping procedures Safe working practices as related to engine-room operations.	**10 hrs**	
3	Basic environmental protection procedures.	**6 hrs**	**6 hrs**
4	Use of appropriate internal communication system. Engine-room alarm systems and ability to distinguish between the various alarms, with special reference to fire-extinguishing gas alarms.	**4 hrs**	
5	Knowledge of emergency duties Escape routes from machinery spaces Familiarity with the location and use of fire-fighting equipment in the machinery spaces.	**6 hrs**	
6	Fire prevention and fire-fighting appliances- Knowledge of classes and chemistry of fire. Knowledge of fire-fighting systems on inland vessels. Understanding of action to be taken in the event of fire, including fires involving oil and chemical systems.	**8 hrs**	
7	Life Saving - knowledge of the operation of survival crafts, their launching appliances and arrangements, and their equipment. Knowledge of survival techniques appropriate to the areas of operation of the vessel.	**8 hrs**	
8	Medical Aid - Ability to provide first aid in the case of accidents that are likely to occur on board.	**6 hrs**	
9	Personal safety and social responsibility	**4 hrs**	
Total		**76 hrs**	

Part B

Progression path from Inland Vessel to Vessels engaged on

Chapter XI

Progression Path from IV to NCV

XI/1 Mandatory minimum requirements for Certification of Master on ships of less than 500 gross tonnage engaged on near coastal voyages

1. Every Master serving on a sea going ship of less than 500 gross tonnage engaged on Near Coastal Voyages shall hold a certificate of competency
2. Every candidate for certification shall

a) Hold a certificate of competency of IV Master Class 1

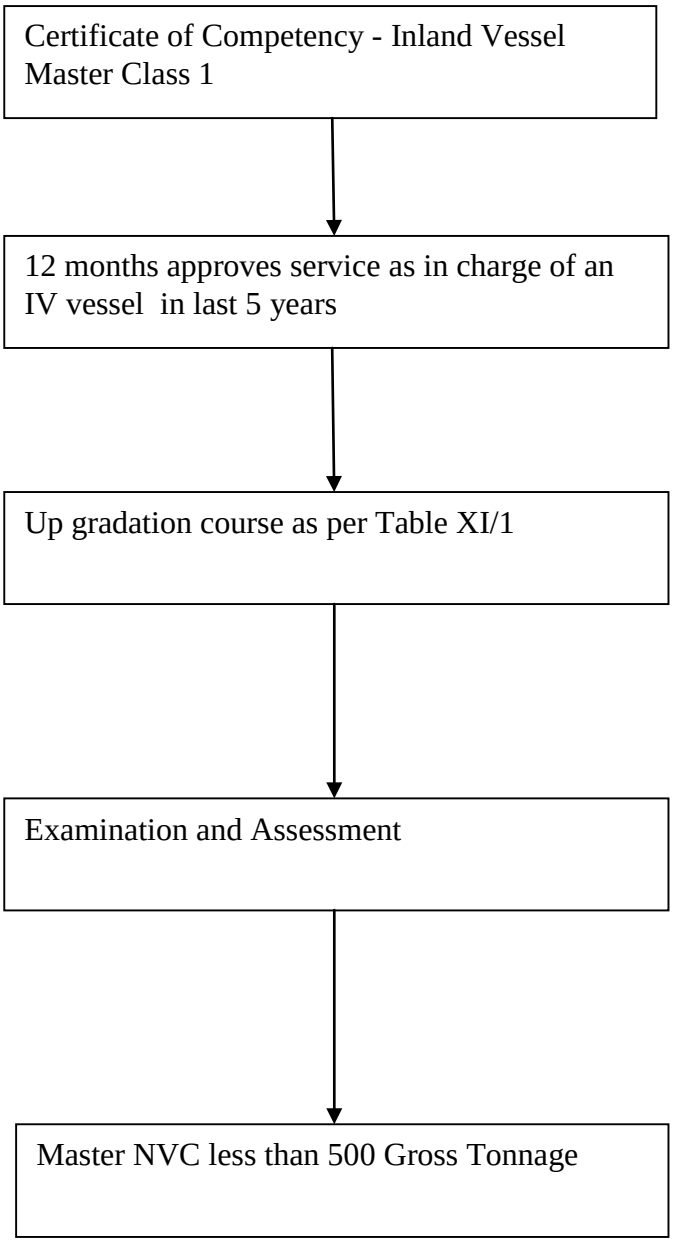
b) be not less than 24 years of age on the date of issue of certificate

c) have approved sea going service of not less than 12 months as in charge of an inland vessel in last 5 years

d) have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

e) have completed approved education, training, examination and assessment and meet the standard of competence specified in Table-XI/1 for upgradation from IV Master Class 1 to Masters on ships of less than 500 gross tonnage engaged on Near-Coastal Voyages

Flow diagram for upgradation from IV Master Class 1 to Master NCV less than 500 Gross Tonnage



XI/2 Mandatory minimum requirements for Certification of Officer in Charge of a Navigational watch (Navigational Watch-keeping Officer) on ships of 500 and above gross tonnage operating in Near Coastal Voyages.-

1. Every officer in charge of a navigational watch serving on a sea going ship of gross tonnage 500 and above, operating in near coastal voyages shall hold a certificate of competency
2. Every candidate for certification shall
   a) Hold a certificate of competency of IV Master Class 1
   b) be not less than 24 years of age on the date of issue of certificate

c) have approved sea going service of not less than 12 months as 2nd Navigation Watch keeper on river sea vessel of gross tonnage 500 and above in last 5 years

d) have completed approved education and training and meet the standards of competence as specified in Tables- VI/1-1, VI/1-2, VI/1-3 and VI/1-4

e) have completed approved education, training, examination and assessment and meet the standard of competence specified in Table-XI/2 for Officer in Charge of a Navigational watch (Navigational Watch-keeping Officer) on ships of 500 and above gross tonnage operating in Near Coastal Voyages

Flow diagram for upgradation from IV Master Class 1 to Officer in Charge of a Navigational watch(NWKO) on ships of 500 and above gross tonnage operating in Near Coastal Voyages.-

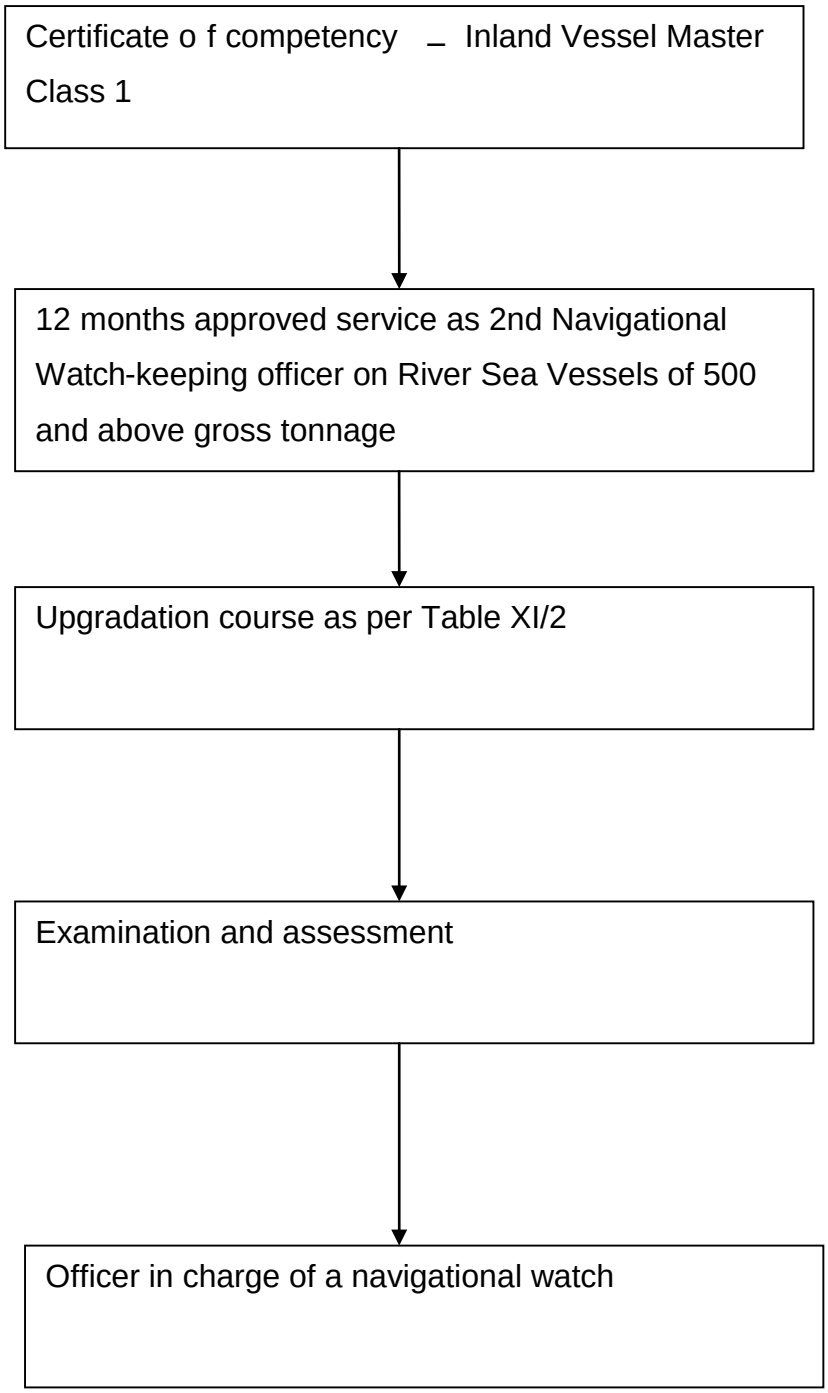


Table A-XI/1

Specification of minimum standard of competence for upgradation from IV Master Class 1 to Masters on ships of less than 500 gross tonnage engaged on NearCoastal Voyages

Function: Navigation at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Plan and conduct a coastal passage and determine position Note: Training and assessment in the use of ECDIS is not required for those who serve exclusively on ships not fitted with ECDIS. These limitations shall be reflected in the endorsement issued to the seafarer concerned	*Navigation* Thorough knowledge of and ability to use nautical charts and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information. Reporting in accordance with General Principles for Ship Reporting Systems and with VTS procedures. Thorough knowledge of and ability to use ECDIS	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training using chart catalogues, charts, nautical publications, radio navigational warnings.	Information obtained from nautical charts and publications is relevant, interpreted correctly and properly applied . Calculations and measurements of navigational information are accurate. Charts and publications selected are the largest scale on board suitable for the area.
Plan and conduct a coastal passage and determine position	Voyage planning and navigation for all conditions by acceptable methods of plotting coastal tracks, taking into account, e.g.: .1 restricted waters .2 meteorological conditions .3 restricted visibility .4 traffic separation schemes .5 vessel traffic service (VTS) areas .6 areas of extensive tidal effects	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service .2 approved training ship	
Plan and conduct a coastal passage and determine	*Navigational aids and equipment* Ability to operate safely and determine the ship's position by use of all navigational aids and	Assessment of evidence obtained from approved radar navigation and ARPA simulator training	Performance checks and tests of navigation systems comply with manufacturer's

position	equipment commonly fitted on board the ships concerned *Automatic pilot* Knowledge of automatic pilot systems and procedures; change-over from manual to automatic control and vice versa; adjustment of controls for optimum performance *Meteorology* Ability to use and interpret information obtained from shipborne meteorological instruments Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems Ability to apply the meteorological information available		recommendations, good navigational practice and IMO resolutions on performance standards for navigational equipment Interpretation and analysis of information obtained from radar is in accordance with accepted navigational practice and takes account of the limits and accuracy levels of radar .Selection of the mode of steering is the most suitable for prevailing weather, sea and traffic conditions and intended manoeuvres Measurements and observations of weather conditions are accurate and appropriate to the passage Meteorological information is evaluated and applied to maintain the safe passage of the vessel

Maintain a safe navigational watch	*Watchkeeping* Thorough knowledge of content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended Knowledge of content of the Principles to be observed in keeping a navigational watch Use of routeing in accordance with the General Provisions on Ships' Routeing Use of reporting in accordance with the General Principles for Ship Reporting	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with accepted principles and procedures A proper look-out is maintained at all times and in conformity with accepted principles and procedures Lights, shapes and sound signals conform with the requirements contained in the

	Systems and with VTS procedures		International Regulations for Preventing Collisions at Sea, 1972, as amended and are correctly recognized The frequency and extent of monitoring of traffic, the ship and the environment conform with accepted principles and procedures Action to avoid close encounters and collision with other vessels is in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended Decisions to adjust course and/or speed are both timely and in accordance with accepted navigation procedures A proper record is maintained of movements and activities relating to the navigation of the ship Responsibility for safe navigation is clearly defined at all times, including periods when the master is on the bridge and when under pilotage

Respond to emergencies	Emergency procedures, including: .1 emergency steering .2 arrangements for towing and for being taken in tow .3 rescuing persons from the sea .4 assisting a vessel in distress .5 appreciation of the action to be taken when emergencies arise in port	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience	The type and scale of the emergency is promptly identified. Initial actions and, if appropriate, manoeuvring are in accordance with contingency plans and are appropriate to the urgency of the situation and the nature of the emergency

Respond to a distress signal at sea	*Search and rescue* Knowledge of the contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual	Examination and assessment of evidence obtained from practical instruction or approved simulator training, where appropriate	The distress or emergency signal is immediately recognized Contingency plans and instructions in standing orders are implemented and complied with

Function: Cargo handling and stowage at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Monitor the loading, stowage, securing and unloading of cargoes and their care during the voyage	*Cargo handling, stowage and securing* Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship Use of the International Maritime Dangerous Goods (IMDG) Code	Examination and assessment of evidence obtained from one or more of the following: 1 approved inservice experience .2 approved training ship experience .3 approved simulator training, where appropriate	Cargo operations are carried out in accordance with the cargo plan or other documents and established safety rules/regulations, equipment operating instructions and shipboard stowage limitations The handling of dangerous, hazardous and harmful cargoes complies with international regulations and recognized standards and codes of safe practice

Function: Controlling the operation of the ship and care for persons on board at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollutionprevention requirements	*Prevention of pollution of the marine environment and anti-pollution procedures* Knowledge of the precautions to be taken to prevent pollution of the marine environment Antipollution procedures and all associated equipment	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience	Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed
Maintain seaworthiness of the ship	*Ship stability* Working knowledge and application of stability, trim and stress tables, diagrams and stresscalculating equipment Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy Understanding of the fundamentals of watertight integrity *Ship construction* General knowledge of the principal structural members of a ship and the proper names for the various parts	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The stability conditions comply with the IMO intact stability criteria under all conditions of loading Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice

Prevent, control and fight fires on board	*Fire prevention and firefighting appliances* Ability to organize fire drills Knowledge of classes and chemistry of fire Knowledge of fire-fighting systems Understanding of action to be taken in the event of fire, including fires involving oil systems	Assessment of evidence obtained from approved firefighting training and experience as set out in STCW 2010 section A-VI/3	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly The order of priority, and the levels and timescales of making reports and
			informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem
Operate life saving appliances	*Life-saving* Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids	Assessment of evidence obtained from approved training and experience as set out in STCW 2010 section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	Medical aid Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship	Assessment of evidence obtained from approved training as set out in STCW 2010 section A-VI/4, paragraphs 1 to 3	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life

Monitor compliance with legislative requirements	*Indian Merchant shipping Act* -Knowledge of registration of ships, management of crew, official log book, crew accommodation and welfare Basic working knowledge of the relevant IMO conventions concerning safety of life at sea and protection of the marine environment Knowledge of documentation required on board, Custom house procedures, Master – Pilot relationship Knowledge of ship management practices wrt ISM Code.	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea and protection of the marine environment are correctly identified

Function: Radiocommunication

Function: Communications

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Communication with shore radio stations and other vessels using VHF and/or MF radio communications appropriate to the vessels concerned and the operations on which they are engaged	Basic knowledge of the International Code of Signals and local signals. Knowledge of VHF and /or MF radio, EPIRB and SART operations procedures appropriate to the vessels concerned and the operations on which they are engaged	[Examination and]assessment of evidence obtained from approved training and in-service experience	Operational and emergency communications are carried out in accordance with operational instructions and emergency or contingency plans

Table A-XI/2

Specification of minimum standard of competence for upgradation from IV Master Class 1 to officers in charge of a navigational watch on ships of 500 gross tonnage and more engaged on near-coastal voyages

Function: Navigation at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Plan and conduct a coastal passage and determine position Note: Training and assessment in the use of ECDIS is not required for those who serve exclusively on ships not fitted with ECDIS. These limitations shall be reflected in the endorsement issued to the seafarer concerned	*Navigation* Thorough knowledge of and ability to use nautical charts and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information Reporting in accordance with General Principles for Ship Reporting Systems and with VTS procedures Thorough knowledge of and ability to use ECDIS	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training using chart catalogues, charts, nautical publications, radio navigational warnings, sextant, azimuth mirror, electronic navigation equipment, echosounding equipment, compass	Information obtained from nautical charts and publications is relevant, interpreted correctly and properly applied The primary method of fixing the ship's position is the most appropriate to the prevailing circumstances and conditions The position is determined within the limits of acceptable instrument/system errors The reliability of the information obtained from the primary method of position fixing is checked at appropriate intervals Calculations and measurements of navigational information are accurate Charts and publications selected are the largest scale on board suitable for the area of navigation and charts are corrected in accordance with the latest information available

Plan and conduct a coastal passage and determine position	Voyage planning and navigation for all conditions by acceptable methods of plotting coastal tracks, taking into account, e.g.: .1 restricted waters .2	Examination and assessment of evidence obtained from one or more of the following: .1 approved training	

	meteorological conditions .3 restricted visibility .4 traffic separation schemes .5 vessel traffic service (VTS) areas .6 areas of extensive tidal effects *Note*: This item is only required for certification as master	ship experience.	

Plan and conduct a coastal passage and determine position	*Navigational aids and equipment* Ability to operate safely and determine the ship's position by use of all navigational aids and equipment commonly fitted on board the ships concerned *Automatic pilot* Knowledge of automatic pilot systems and procedures; change-over from manual to automatic control and vice versa; adjustment of controls for optimum performance *Meteorology* Ability to use and interpret information obtained from shipborne meteorological instruments. Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems Ability to apply the meteorological information available	Assessment of evidence obtained from approved radar navigation and ARPA simulator training	Performance checks and tests of navigation systems comply with manufacturer's recommendations, good navigational practice and IMO resolutions on performance standards for navigational equipment Interpretation and analysis of information obtained from radar is in accordance with accepted navigational practice and takes account of the limits and accuracy levels of radar Errors in magnetic compasses are determined and applied correctly to courses and bearings Selection of the mode of steering is the most suitable for prevailing weather, sea and traffic conditions and intended manoeuvre Measurements and observations of weather conditions are accurate and appropriate to the passage Meteorological information is evaluated and applied to maintain the safe passage of the vessel

Maintain a safe navigational watch	*Watchkeeping* Thorough knowledge of content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended Knowledge of content of the Principles to be observed in keeping a navigational watch Use of routeing in accordance with the General Provisions on Ships' Routeing Knowledge of blind pilotage techniques Use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with accepted principles and procedures A proper look-out is maintained at all times and in conformity with accepted principles and procedures Lights, shapes and sound signals conform with the requirements contained in the International Regulations for Preventing Collisions at Sea, 1972, as amended and are correctly recognized The frequency and extent of monitoring of traffic, the ship and the environment conform with accepted principles and procedures Action to avoid close encounters and collision with other vessels is in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended Decisions to adjust course and/or speed are both timely and in accordance with accepted navigation procedures A proper record is maintained of movements and activities relating to the navigation of the ship Responsibility for safe navigation is clearly defined at all

			times, including periods when the

			master is on the bridge and when under pilotage
Maintain a safe navigational watch	*Bridge resource management* Knowledge of bridge resource management principles, including: .1 allocation, assignment, and prioritization of resources .2 effective communication .3 assertiveness and leadership .4 obtaining and maintaining situational awareness	Assessment of evidence obtained from one or more of the following: .1 approved training .2 approved in-service experience .3 approved simulator training	Resources are allocated and assigned as needed in correct priority to perform necessary tasks Communication is clearly and unambiguously given and received Questionable decisions and/or actions result in appropriate challenge and response Effective leadership behaviours are identified Team member(s) share accurate understanding of current and predicted vessel state, navigation path, and external environment
Respond to emergencies	Emergency procedures, including: .1 precautions for the protection and safety of passengers in emergency situations .2 initial assessment of damage and damage control .3 action to be taken following a collision .4 action to be taken following a grounding In addition, the following material should be included for certification as master: .1 emergency steering .2 arrangements for towing and for being taken in tow .3 rescuing persons from the sea .4 assisting a vessel in distress .5 appreciation of the action to be taken when emergencies arise in port	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 practical instruction	The type and scale of the emergency is promptly identified Initial actions and, if appropriate, manoeuvring are in accordance with contingency plans and are appropriate to the urgency of the situation and the nature of the emergency

Respond to a distress signal at sea	*Search and rescue* Knowledge of the contents of the International Aeronautical and Maritime Search and	Examination and assessment of evidence obtained from practical	The distress or emergency signal is immediately recognized

	Rescue (IAMSAR) Manual	instruction or approved simulator training, where appropriate	Contingency plans and instructions in standing orders are implemented and complied with
Manoeuvre the ship and operate small ship power plants	*Ship manoeuvring and handling* Knowledge of factors affecting safe manoeuvring and handling The operation of small ship power plants and auxiliaries Proper procedures for anchoring and mooring	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate	Safe operating limits of ship propulsion, steering and power systems are not exceeded in normal manoeuvres Adjustments made to the ship's course and speed maintain safety of navigation Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times

Function: Cargo handling and stowage at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Monitor the loading, stowage, securing and unloading of cargoes and their care during the voyage	*Cargo handling, stowage and securing* Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship Use of the International Maritime Dangerous Goods (IMDG) Code	Examination and assessment of evidence obtained from one or more of the following: 1 approved inservice experience .2 approved training ship experience .3 approved simulator training, where appropriate	Cargo operations are carried out in accordance with the cargo plan or other documents and established safety rules/regulations, equipment operating instructions and shipboard stowage limitations The handling of dangerous, hazardous and harmful cargoes complies with international regulations and recognized standards and codes of safe practice
Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks	Knowledge* and ability to explain where to look for damage and defects most commonly encountered due to: .1 loading and unloading operations .2 corrosion .3 severe weather conditions Ability to state which parts of the ship shall be inspected each time in order to cover all parts within a given period of time Identify those elements of the ship structure which are critical to the safety of the ship State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate	The inspections are carried out in accordance with laiddown procedures, and defects and damage are detected and properly reported Where no defects or damage are detected, the evidence from testing and examination clearly indicates adequate competence in adhering to procedures and ability to distinguish between normal and defective or damaged parts of the ship

Function: Controlling the operation of the ship and care for persons on board at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollutionprevention requirements	*Prevention of pollution of the marine environment and anti-pollution procedures* Knowledge of the precautions to be taken to prevent pollution of the marine environment Antipollution procedures and all associated equipment	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience	Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed
Maintain seaworthiness of the ship	*Ship stability* Working knowledge and application of stability, trim and stress tables, diagrams and stresscalculating equipment Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy Understanding of the fundamentals of watertight integrity *Ship construction* General knowledge of the principal structural members of a ship and the proper names for the various parts	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The stability conditions comply with the IMO intact stability criteria under all conditions of loading Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice

Prevent, control and fight fires on board	*Fire prevention and firefighting appliances* Ability to organize fire drills Knowledge of classes and chemistry of fire Knowledge of fire-fighting systems Understanding of action to be taken in the event of fire, including fires involving oil systems	Assessment of evidence obtained from approved firefighting training and experience as set out in STCW 2010 section A-VI/3	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly The order of priority, and the levels and timescales of making reports and
			informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem
Operate life saving appliances	*Life-saving* Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids	Assessment of evidence obtained from approved training and experience as set out in STCW 2010 section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	Medical aid Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship	Assessment of evidence obtained from approved training as set out in STCW 2010 section A-VI/4, paragraphs 1 to 3	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life

Monitor compliance with legislative requirements	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea and protection of the marine environment	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea and protection of the marine environment are correctly identified

Function: Radiocommunication (Specification of minimum standard of competence for GMDSS radio operators)

Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**

Transmit and receive information using GMDSS subsystems and equipment and fulfilling the functional requirements of GMDSS	In addition to the requirements of the Radio Regulations, a knowledge of: .1 search and rescue radiocommunications, including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual .2 the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts .3 ship reporting systems .4 radio medical services .5 use of the International Code of Signals and the IMO Standard Marine Communication Phrases .6 the English language, both written and spoken, for the communication of information relevant to safety of life at sea *Note*: This requirement may be reduced in the case of the Restricted Radio Operator's Certificate	Examination and assessment of evidence obtained from practical demonstration of operational procedures, using: .1 approved equipment .2 GMDSS communication simulator, where appropriate* .3 radiocommunication laboratory equipment	Transmission and reception of communications comply with international regulations and procedures and are carried out efficiently and effectively English language messages relevant to the safety of the ship and persons on board and protection of the marine environment are correctly handled
Provide radio services in emergencies	The provision of radio services in emergencies such as: .1 abandon ship .2 fire on board .3 partial or full breakdown of radio installations Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, electrical and non-ionizing radiation hazards	Examination and assessment of evidence obtained from practical demonstration of operational procedures, using: .1 approved equipment .2 GMDSS communication simulator, where appropriate* .3 radio communication laboratory equipment	Response is carried out efficiently and effectively

Part C

Chapter XII

Recommended Equivalency table

Chapter XII

Recommended Equivalency table

Table XII/1- Equivalency Table for serving on vessels on Near Coastal Voyages

S.N.	Competency	NCV < 500 GT	NCV 500-<1600 GT	NCV 1600-3000 GT
1	NWKO NCV Written	Chief Officer, (6m experience of rank certificate held, AFF, PSCRB, MFA, ROC, GMDSS,SSO, Oral exam)	NA	NA

2	NWKO NCV/ Ex Navy officer with recent sea service	Chief Officer, (15 days ship masters business course, Oral Exam)	Chief Officer (6months experience, 15 days ship masters business course, Oral Exam)	Chief Officer (6months experience, 15 days ship masters business course, Oral Exam)
3	Mate NCV / Ex Navy officer with recent sea service	Master (6m experience of rank certificate held)	Chief Officer	Chief Officer
4	2nd Mate FG	Master (SSO, ISM, 15 days ship masters business course, oral exam)	Chief officer((6 months experience, SSO, ISM Int Audit, 15 days ship masters business course, oral exam)	Chief officer((6 months experience, SSO, ISM Int Audit, 15 days ship masters business course, oral exam
5	Mate FG	Master (SSO, ISM, 15 days ship masters business course, oral exam)	Chief officer	Chief officer

Table XII/2 - Equivalency Table for serving on River Sea Vessels

S.N.	**Competency**	**RSV < 500 GT**	**RSV 500-1600 GT**	**RSV 1600-3000 GT**
1	Watch rating/AB	NWKO RSV (12 months recent bridge watchkeeping experience, Aid Course, AFF, PSCRB, MFA, ROC, GMDSS,SSO, Oral exam)	NWKO RSV (12 months recent bridge watchkeeping experience, Aid Course, AFF, PSCRB, MFA, ROC, GMDSS,SSO, Oral exam)	**NA**

2	NWKO NCV Written/ Ex Navy officer with recent sea service	Chief Officer (6m experience of rank certificate held, AFF, PSCRB, MFA, ROC, GMDSS,SSO, Oral exam)	2nd officer (6m experience of rank certificate held, AFF, PSCRB, MFA, ROC, GMDSS,SSO, Oral exam)	2nd officer (6m experience of rank certificate held, AFF, PSCRB, MFA, ROC, GMDSS,SSO, Oral exam)
3	NWKO NCV/ Ex Navy officer with recent sea service	Master, (6m experience of rank certificate held, GMDSS,SSO, ISM internal Audit course, 15 days ship masters business course, Oral Exam)	Master, (6m experience of rank certificate held, GMDSS,SSO, ISM internal Audit course, 15 days ship masters business course, Oral Exam)	Chief Officer, (6m experience of rank certificate held, ISM)
4	Mate NCV / Ex Navy officer with recent sea service	Master (6m experience of rank certificate held)	Master (6m experience of rank certificate held)	Chief Officer, (6m experience of rank certificate held)
5	2nd Mate FG	Master (6m experience of rank certificate held SSO, ISM, 15 days ship masters business course, oral exam)	Master (6m experience of rank certificate held SSO, ISM, 15 days ship masters business course, oral exam)	Chief officer (6 months experience, ISM)
6	Mate FG	Master (6m experience of rank certificate held SSO, ISM, 15 days ship masters business course, oral exam)	Master (6m experience of rank certificate held SSO, ISM, 15 days ship masters business course, oral exam)	Chief officer

Annexure 1

Table - 1

Comparison of Induction Training in the Inland Vessel Sector

States	Assam Crew Training Centre (CTC)	Goa Maritime School Britona (MSB)	Kerala KSINCO Navigation Training Centre (KNTC)	Central Govt. (IWAI) National Inland Navigation Institute (NINI)	Recommendation

Eligibility Criteria					
Age (Minimum/maximum)	Not Specified	Not Specified	Not Specified	Min - 17½ Years Max - 25 Years	Min - 16 years Max - 25 Years
Education Qualification	9th Pass or in 10th	Metric or High School		10th Pass	10th Pass
Physical Standards	Physically fit and swimming test	Physically fit	Physically Fit	Physically fit certified by Medical Practitioner	Physically fit certified by Medical Practitioner as per Medical Standards for IV personnel (DGS)
Medical Standards Eyesight	No Standards	No Standards	No Standards	No Colour blindness and 6x6 for Deck side	Eye sight requirements as per DGS Medical Standards for IV personnel

Comparison of Induction Training in the Inland Vessel Sector
Annexure 1
Table - 1

States	Assam Crew Training Centre (CTC)	Goa Maritime School Britona (MSB)	Kerala KSINCO Navigation Training Centre (KNTC)	Central Govt. (IWAI) National Inland Navigation Institute (NINI)	Recommendation
Selection Process					
Target area	Assam	Goa	Kerala	All India	IV Entrance Test locally or regionally approved by state government
Entrance Test	Swimming	None	None	Written Objective	MCQ Written Test
Interview	Yes	Yes	Yes	Yes	Yes
Psychological Profiling	No	No	No	Yes	Yes
Swimming Test	Yes	Yes	No	No	No, the candidate should be made to learn swimming before passing out and must pass the swimming test before passing out

Annexure 1
Table - 1

States	Crew Training Centre (CTC) Assam	Maritime School Britona Goa	KSINCO Navigation Training Centre Kerala	National Inland Navigation Institute (NINI)	Recommendation
Course Curriculum					
Residential	Yes	Yes	No	Yes	The induction training shall be fully/ partly residential

Comparison of Induction Training in the Inland Vessel Sector

Day School	No	No	Yes	No	
Course Duration	6 month	4 months	6 Months	6 Months	6 Months
River knowledge	Yes	Yes	Yes	Yes	Yes
Navigation	Needs Up gradation	Needs up gradation	Needs Up gradation	Satisfactory	Yes
Cargo Handling & Stowage	Limited Covered	Iron ore specific	Little Covered	Satisfactory	Yes
Passenger	Limited Covered	Limited Covered	Limited Covered	Limited Covered	Yes
Controlling the operation of the ship and care for persons on board	No	No	No	Yes	Yes
Communication	No	No	No	Limited Cover	Yes
Marine engineering	Yes	Yes	Yes	Yes	Yes
Electrical, electronic and control engineering	Limited Covered	Limited Covered	Limited Covered	Limited Covered	Yes
Maintenance and repair	Limited Covered	Limited Covered	Limited Covered	Limited Covered	Yes
Workshop Training	Limited Covered	Limited Covered	Limited Covered	Limited Covered	Yes
Elementary first aid	No	St. John	No	DGS	Yes (DGS)
Fire prevention and fire fighting	Only fire Extinguisher	Only fire Extinguisher	Only fire Extinguisher	Only fire Extinguisher	Yes (DGS)
Proficiency in Survival techniques	Limited Covered	Limited Covered	Limited Covered	Limited Covered	Yes (DGS)
Personal Safety & Social Responsibility	Limited Covered	Limited Covered	Limited Covered	Limited Covered	Yes (DGS)

Comparison of Induction Training in the Inland Vessel Sector

Annexure 1
Table - 1

States	Crew Training Centre (CTC) Assam	Maritime School Britona Goa	KSINCO Navigation Training Centre Kerala	Central Govt (IWAI) National Inland Navigation Institute (NINI)	Recommendation
Examination					
External/Internal	Internal	Internal	Internal	Internal	Regional / Local Entrance Test
Written	Yes	Yes	Yes	Yes	Yes
Orals	Yes	Yes	Yes	Yes	Yes
Practical	Yes	Yes	Yes	Yes	Yes
Certificate					
Recognised by IWT Dept	Yes	Yes	No	No	Yes
Recognised by Industry	Yes	Yes	No	Yes	Yes

Annexure I
I

Table – 2
Comparison of eligibility criteria for COC of Master Class III in the Inland Vessel Sector

Eligibility Criteria	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
Age (Minimum/maximum)	>=21years	>=21years	>=21Years	>=21years	>=21 years		>=19years
Education Qualification	IXth Pass or in 10th	VIIth Pass	Xth Pass	Not specified	Not specified	Xth Pass (English as one subject)	Xth Pass (English as one subject)
Physical Standards	No Standards	No Standards	Specified Standards Form 33	No Standards	No Standards		Physically fit certified by Medical Practitioner as per Medical Standards (ILO/DGS)
Medical Standards Eyesight	Perfect Eyesight without Colour Blindness	Normal Eyesight without Colour Blindness	Specified Standards form 33	No Colour blindness and sight 6x6			Eye sight requirements as per ILO/DGS Medical Standards

Annexure

Preparatory Training for COC	No	No	No	No		Strongly recommended by all interested parties	2 months preparatory course

Table – 2
Comparison of eligibility criteria for COC of Master Class III in the Inland Vessel Sector

Service	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
As Lascar or Greaser	3 years	5years / 3years if IXth Pass	1 year on vessel >= 113BHP	3 years	4 years .	4 years total service to upgrade from Deck Rating to Serang	2 year as deck rating if undergone 6 months induction training or 3 years (If no induction training)
As Helmsman or Sukhani	1 year	1 year	1 year on vessel >= 113BHP	1 Year	1 year		
Total	4 years	6 years/ 4years	2 Years on vessel >= 113BHP	4 years	5 years		
Alternate							2 years apprenticeship with SSTP for Inland Vessel Cadets

Annexure I

I

Table – 3

Comparison of eligibility criteria for COC of Master Class II in the Inland Vessel Sector

Eligibility Criteria	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
Age (Min/maximum)	>=22years	>=27years and < 55years	>=22Years	>=22years	>=22years		>=21years
Education Qualification	IXth Pass or in 10th	VIIth Pass	Xth Pass	Not specified		Xth Pass (English as one subject)	Xth Pass (English as one subject)

Annexure

Physical Standards	No Standards	No Standards	Specified Standards form 33	No Standards			Physically fit certified by Medical Practitioner as per Medical Standards (ILO/ DGS)
Medical Standards Eyesight	Perfect Eyesight without Colour Blindness	Normal Eyesight without Colour Blindness	Normal Eyesight without Colour Blindness	No Colour blindness and 6x6 for Dk side			Eye sight requirements as per ILO/DGS Medical Standards

Table – 3

Comparison of eligibility criteria for COC of Master Class II in the Inland Vessel Sector

Service	**Assam**	**Goa**	**Kerala**	**West Bengal**	**Maharashtra**	**Research Survey outcome**	**Recommendation**
As Lascar or Greaser			2 years at sea or inland Vessel	2 years		The Governing bodies, Deck and	As deck rating 3 years >=226 BHP Or

Annexure I

Helmsman or Sukhani with Serang COC	3 years >=45NHP	2 years >= 282 BHP		3years >= 45NHP without COC	3yrs >=282BHP	Engine personnel want it from 2 to 4 years, and Inland Vessel operator want it to be reduced to 2 years.	6 years <226 BHP and minimum 6 months on vessel >=226BHP Or As Serang 2 years < 226 BHP
As Serang with Serang certificate	1 year >=45NHP	3 years < 282 BHP	3 years	3Years >=15NHP	2years>=113BHP and 1 year Helmsman(282BHP)		
Total	3+1 = 4 years	2years or 3years as above	2+3 = 5 Years	5 years	3 years		2 to 6 years as above
Alternate			6 years as Lascar/ Deck hand >= 226 BHP				

Annexure I

Table – 4

Comparison of eligibility criteria for COC of Master Class I in the Inland Vessel Sector

Eligibility Criteria	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
Age (Min/maximum)	>=22 years	>=29 years	>=22 Years	>=24 years	>=25 years		>=23 years
Education Qualification	IXth Pass	VIIth Pass	Xth Pass	Not specified		Xth Pass (English as one subject)	Xth Pass (English as one subject)
Physical Standards	No Standards	No Standards	Specified Standards form 33	No Standards			Physically fit certified by Medical Practitioner as per Medical Standards (ILO/DGS)
Medical Standards Eyesight	Perfect Eyesight without Colour Blindness	Normal Eyesight without Colour Blindness	Normal Eyesight without Colour Blindness	No Colour blindness and 6x6 for Deck side			Eye sight requirements as per ILO/DGS Medical Standards

Table – 4

Comparison of eligibility criteria for COC of Master Class I in the Inland Vessel Sector

Annexure I

Service	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
Second In-charge with Second Class Master COC	3 years >=45NHP	2 years >= 565 BHP	4 years or	4years		The Governing bodies and Vessel operators want 2years service whereas on board Deck and Engine personnel want it from 2 to 4 years.	2years >=565BHP
Master Incharge with Second Class Master COC	1 year >=45NHP	1.5years >=226 BHP	3 years >= 260 BHP	3Years	3 years >=170 BHP		2 years >= 226 BHP
Total	3+1 = 4 years	2yrs or 1.5yrs as above	4 or 3 yrs as above	4 or 3 years			2 years as above
Alternate 1			2nd Mate FG or Mate NCV trade with 1 yr experience as mate on IV for 1 year	22years age for 2nd Mate COC with 1 yr experience as Mate/ master of river vessel	1 year as 2nd Mate / Mate		2nd Mate FG or Mate NCV or NWKO with 1 year experience as 2nd I-Charge on Inland vessel
Alternate 2			3yrs at sea and 3 yrs as Mate of IV or 6yrs as mate of IV				

Table – 5

Comparison of eligibility criteria for COC of Second Engine Driver in the Inland Vessel Sector

Annexure I

Eligibility Criteria	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
Age (Minimum/maximum)	>=22 years	>=25 years and <55 years	>=22 Years	>=21 years	>=21 years		>=19 years
Education Qualification	IXth Pass or in 10th	VIIth Pass	ITI Diesel or Motor Mechanic	Not specified		Xth Pass (English as one subject)	Xth Pass (English as one subject)
Physical Standards	No Standards	No Standards	Specified Standards Form 33	No Standards			Physically fit certified by Medical Practitioner as per Medical (ILO/DGS)
Medical Standards Eyesight	No Standards	No Standards	Specified Standards form 33	No Colour blindness and 6x6 for Deck side			Eye sight requirements as per ILO/DGS Medical Standards
Preparatory Training for COC	No	Yes, 45 days	No	No	No	Strongly recommended by all interested parties	Yes, 2 months if not done Induction training

Table – 5
Comparison of eligibility criteria for COC of Second Engine Driver in the Inland Vessel Sector

Service	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
As Greaser	4 years	4years	1 year on vessel >= 113BHP	3 years	3 years on 226BHP	Majority of people say it should be 4 years as	As Engine rating 3 year

Annexure I

As assistant driver		1 year >=226BHP	1 year on vessel >= 113BHP	1 Year as serang or Tindal or chief Greaser	1 Year as serang or Tindal or chief Greaser	Engine Room Rating	>=226BHP Or 4 year >=113BHP Or 6 years < 113 BHP
Total	4 years	4+1=5years or 6 years as greaser	2 Years on vessel >= 113BHP	4 years	4 years		
Alternate 1		For 9th standard pass student Either 4 years at sea or IW out of which 1 year as Oil and chemicalman or assistant driver; Or 4 years as sailor and six months as assistant driver on Inland vessels	Apprentice for two years in making, repairing, fitting of IC Engines and 1 year on IV>=113BHP or 6 months>= 226BHP	3years workshop apprentice with 6months on IV>=85BHP or 9months on IV>=40BHP			2 years apprenticeship on board IV >= 226 BHP with SSTP for Inland Vessel Cadets Engine If < 226BHP then 3years
Alternate 2				5years>=85BHP or 6 years>=40 BHP of which 1 year shall be chief Serang, Tindal or Ch.greaser			

Table – 6

Comparison of eligibility criteria for COC of First Engine Driver in the Inland Vessel Sector

Eligibility Criteria	Assam	Goa	Kerala	Maharashtra	West Bengal	Research Survey outcome	Recommendation

Annexure I

Age (Minimum/maximum)	>=25 years	>=27 years	>=22 Years	>=22 Years	>=22 years		>=21 years
Education Qualification	IXth Pass or in 10th	VIIth Pass	ITI Diesel or Motor Mechanic		Not specified	Xth Pass (English as one subject)	Xth Pass (English as one subject)
Physical Standards	No Standards	No Standards	Specified Standards Form 33		No Standards		Physically fit certified by Medical Practitioner as per Medical Standards (ILO/DGS)
Medical Standards Eyesight	No Standards	No Standards	Specified Standards form 33		No standards		Eye sight requirements as per ILO/DGS Medical Standards
Preparatory Training for COC	No	Yes, 45 days	No	No	No	Strongly recommended by all interested parties	3 months preparatory course

Table – 6

Comparison of eligibility criteria for COC of First Engine Driver in the Inland Vessel Sector

Service	**Assam**	**Goa**	**Kerala**	**Maharashtra**	**West Bengal**	**Research Survey outcome**	**Recommendation**
As Assistant Driver on engineering watch with 2nd class Engine Driver COC		1year >= 565 BHP or 18month >= 226 BHP Or	1 year on vessel >= 565BHP or 2 years>=226 BHP And		1 year>=565 Or 2years>=223 BHP	Governing bodies, Inland Vessel operators and Engine personnel	As second in-charge 2 years >=565 BHP Or

Annexure I

As Engine driver incharge with 2nd class Engine Driver COC	3 years	18months >=113BHP	18months >=113BHP	1year >= 565 BHP or 18month >= 226 BHP 3 yrs>= 170BHP+ 2yrs as Greaser		serving on board say the service experience shall be 2 years.	As incharge 2years>=2 230 BHP 3 years >=113 BHP 4 years < 113 BHP
Total	3 years	As above 1 year or 18months	As above 1+18months or 2+18months	1yr or 18 months or 5 years	1 or 2 years		
Alternate 1					4 years in engine room with 2ndclass engine driver COC of which 1 year on IV>=226BHP as serang, chief greaser or Principal Tindal		

Table – 7

Comparison of eligibility criteria for COC of Engineer of an Inland Vessel

Eligibility Criteria	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
Age		>=29 years	>=22 Years	>=22 years	>=23 years		>=23 years
Education Qualification		VIIth Pass	ITI Diesel or Motor Mechanic	4years apprentice engineer		Xth Pass (English as one subject)	Xth Pass (English as one subject)

Annexure I

Physical Standards		No Standards	Specified Standards Form 33	No Standards			Physically fit certified by Medical Practitioner as per Medical Standards (ILO/DGS)
Medical Standards Eyesight		No Standards	Specified Standards form 33	No standards			Eye sight requirements as per ILO/DGS Medical Standards
Preparatory Training for COC		Yes, 45 days	No	No		Strongly recommended by all interested parties	3 months preparatory course

Annexure

I

Table – 7

Comparison of eligibility criteria for COC of Engineer of an Inland Vessel

Service	Assam	Goa	Kerala	West Bengal	Maharashtra	Research Survey outcome	Recommendation
As Assistant Engineer with 1st class Engine Driver COC		18months >= 226 BHP or 27month <226 BHP	Apprentice engineer 2 years	18months >=565BHP Seagoing Or 27months>=565BHP IV	18months >=565BHP Seagoing Or 27months>=565BHP IV	Majority says it should be 2 years	As Assistant Engineer 2 year>=565 BHP 3years>=226 BHP Or As in-charge 2 years>=226BHP 3years>=113 BHP
As Engine driver incharge with 1st class Engine Driver COC			4years >=226BHP 2years >=565BHP				
Total		18months >= 226 BHP or 27month <226 BHP	As above 1+18months or 2+18months	6 yrs. on seagoing vsl. or 9yrs. IV in lieu of 4yrs apprenticeship	18months >=565BHP Seagoing Or 27months>=565BHP IV		

Annex-2

Risk Management in IV Sector

Like any other industry, the Inland Water Transport also has a lot of hazards in navigation, cargo operations, communication, machinery operations, etc. and the sources of potential harm or damage or situations with potential for harm or damage which are the causes of an event or accident can not be taken away.

There have been many accidents and near misses reported on IV vessels. It is the need of the hour to carry out a proper assessment of the risks associated with the hazards before starting any operation.

One of the major difference between the STCW 95 and STCW 2010 amendment is that the latter has given a lot of emphasize on the risk management in ship operation.

IMO's other instrument for the safe operation of ship and pollution prevention ISM Code has one of the objective as to assess all risks to its ships, personnel and the environment and establish appropriate safeguards. This also puts responsibility on the shipping company to establish procedures plans and instructions including checklist as appropriate for the shipboard operations concerning the safety of personnel, ship and protection of the environment.

A hazard is a source of potential harm or damage or a situation with potential for harm or damage. It is the cause of an event or accident which can not be taken away. For example the bore tide at Kolkata or insufficient depth of inland waterways are the hazards every inland vessels are experiencing during Inland navigation. Many times the inland vessels are pushed off the channels by strong currents and thus putting them at the risk of running aground and getting damaged. Therefore the risk associated with any hazard must be assessed and control measures must be taken for carrying out safe operations.

A risk has two elements, first the likelihood that a hazard may occur and second is the consequence of the hazardous event.

A risk assessment can be carried out by following steps:

(a) identify hazards and personnel at risk in the work activity
(b) estimate the risk
(d) identify the risk controls

(e) decide the tolerable level of the risks (f) plan risk control action (g) review adequacy of action.

Every company operating Inland Vessels should have a risk assessment and safety culture. It is an effective way to prevent accidents, because it examines the likelihood of injury, damage or loss and what can be done to prevent such injury, damage or loss. The unsafe practices and hazards are identified by risk assessment, which will not eliminate every accident but it will certainly raise awareness of crew to the hazards surrounding them. It is an on going process helps in planning for the unexpected.

After identifying the risk involved in any activity, the level of risk should be reduced to a level that is as low as is reasonably practicable (ALARP). If a "tolerable" level of risk can be reduced still further for a reasonable cost and with little effort, then it should be.

The company should establish a policy to identify the hazards and assess all risks to its vessels, personnel and the environment and establish appropriate safeguards. The crew on board shall assess all risks to its vessels, personnel and the environment and establish appropriate safeguards in line with the company policy.

The company and crew shall assess the associated risks for at least the following Hazards

1. Navigational hazards / consequences when navigating in inland waters

Hazards	**Consequences**
Shifting of navigation channel	Running aground Capsizing when running aground Dragging of Anchor Loss of anchor Pollutions Commercial delays
Navigating in sharp bends	Running aground Capsizing when running aground Collisions Pollution Commercial delays
Wrong estimate of Air Draft (Tide, flood etc.)	Running aground Capsizing when running aground Contact with overhead bridges, cranes Commercial delays
Eddies	Running aground Capsizing when running aground Dragging of Anchor Loss of anchor pollution

Collision, Grounding, fire, Explosion	Sinking Ingress of water Damaged vessel and cargo Pollution Fire
Machinery failure Main Engine Failure Steering Failure Gyro Failure	Running aground Capsizing when running aground Collisions Pollution Commercial delays Blackout
Communication Error, Steering Orders ,Instructions from Port Control etc. misunderstood	Running aground Collisions Pollution
	Commercial delays
Adverse Weather	Running aground Collisions Pollution
Added Risk of collision due traffic density/lack of training	Running aground Capsizing when running aground Collisions Pollution Commercial delays
Poor Maintenance of Buoys and light houses Wrong identification of markers, buoys, Light House Buoys and markers out of position Channel Buoys - did not mark the extremities of the channel Leading Lights could not be distinguished /missing	Running aground Capsizing when running aground Collisions Pollution Commercial delays Blackout
Effect of Bore tide Direction and Rate of current NOT known Local Currents -wrongly estimated (strong Run and stretch of bore tide)	Running aground Capsizing when running aground Collisions Pollution Commercial delays Blackout
Leeway due to wind NOT correctly estimated	Running aground Capsizing when running aground Collisions Pollution Commercial delays
Visibility NOT correctly estimated	
Increased drift due to inadequate UKC	

Human error, poor training of Ship staff, Pilot, Lack of training facilities	Running aground Capsizing when running aground Collisions Pollution Fire Commercial delays Blackout

2. Hazards in Cargo handling and Stowage & consequences

Hazards	**Consequences**
Leaking hatch cover (If fitted) Hold bilge system in-operational (If fitted)	Cargo damages and claims Poor stability
Cargo shifting	List Reduced freeboard on one side
Water entry in holds (without hatch covers)	Cargo damages and claims Poor stability, free surface effect
Hazardous cargo	Health Hazards Damages to cargo holds
Improper loading	Undesirable trim List Exceeding load density Poor manoeuvring Poor steering Stresses exceeding Structural damages
Bad operation of cargo gears	Damages to cargo hold platings and ladder
Rain Bad weather	Water entry in holds Cargo damages Increased cargo operation time
Large range of tide at port	Vessel surging and swaying Difficulty in cargo operation

3. Hazards in controlling the operation of the vessel and care for persons on board & consequences

Hazards	**Consequences**

Oil overboard	Inland water pollutions
Inadequate Stability	Stresses exceeding Structural damages Violent rolling Capsizing
Crowd moving on one side	List Man overboard
Fire on board	Damages to vessel, cargo and human
Medical sickness/injury	Delayed medical assistance

The company and the crew shall assess the risk associated with each hazards as given in the following examples -

e.g. 1 Mooring operation – Following are the risk associated

a) Being hit by hawser in snap back area
b) Being caught by hawser
c) Falls & trips
d) Hand injuries and bruises especially from handling of worn out hawsers
e) Skin burns caused by synthetic hawsers
f) Back injuries caused by handling of heavy loads/pulling
g) Frostbite in cold climate
h) Sunstroke / sunburn in hot climate

Control measures

.4 Stand clear of snap back area
.5 Stand clear of rope bight
.6 Wear proper personal protective gears
.7 Maintain situational awareness
.8

e.g.2 Painting operations - Following are the risk associated

- Risk of explosion & fire
- Poisoning by paint solvents
- Irritation of eyes, skin and breathing organs
- Blood poisoning through skin bruises and high pressure painting
- Development of allergies
- Long term illness from exposure to solvents
- Muscular injuries from working in inconvenient positions

Control measures

.10 Use proper personal protective gears
.11 Ventilate work area

.12 keep sources of heat away

e.g.3 Crane operation – Risks associated while operating crane, shifting a load at sea.

- Boom falling because of over load or faulty rigging
- Personnel hit by falling load
- Personnel struck by manoeuvring of cargo or loads
- Back injuries from attempting to load heavy loads
- manually Hand injuries from sharp edges Ship rolling and
- pitching. Load swinging.
-

Control measures

- Adjust course to minimise the effect of weather
- Rig steadying lines
- Steadying lines should be kept taut and slackened as required.
- Proper communication
- Slow and steady operation

The risk assessment and management is a very important function of inland vessel operation and same to be included in competency tables.

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Part D

Research Data Analysis