with corrections.

DIRECTORATE GENERAL OF SHIPPING

	Examination, Assessment & Certification (EAC Branch)	**IS/ISO Clause No. 7.1**
QMS Reference No.: EACQP – 07-1	**Subject : Certification of Marine Engineers for Near Coastal Voyage Vessels (NCV) & Bridging for Foreign Going Vessel, Upgradation Course for NCV Stream under STCW Convention as amended by 2010 Manila Amendments (Flow Diagrams)**	**File No.** ENG/IMO-26(4)/STCW-NCV-Vol. I
Authorized by: CS/ DG	**Circular No:** STCW 2010 Training Circular No. 18 of 2012	**Date:** 08.07.2012

Introduction:

1.1 As the shipping Industry and the seafarers are well aware, the International Convention on Training Certification and Watch keeping for Seafarers 1978 as amended in 1995 has further been amended by the Manila amendments 2010 (herein after referred to as STCW 2010), and has entered into force on **1st January 2012** and will be fully implemented by **31st December 2016**. The amendments to the Seafarers' Training, Certification and Watch keeping (STCW) Code, are contained in the mandatory standards regarding provisions of the annex to the 1978 STCW Convention, as amended in Part A and, recommended guidance regarding provisions of the 1978 STCW Convention, as amended, in Part B.

1.2 This Convention requires establishment of training and certification procedures in conformity with the requirements of the revised Convention with effect from 1st July 2013 for new entrants. However, the transitional provisions permit existing certificates to remain valid until 31st December 2016 after which such certificates will not be valid for sea service.

The following grades of certificates will be issued under the amended STCW Convention:

2.1 Marine Engineer Officer Class IV CoC (750 kW propulsion power or more)
2.2 Marine Engineer Officer Class II CoC (3000 kW propulsion power or more)
2.3 Marine Engineer Officer Class I CoC (3000 kW propulsion power or more)
2.4* Second Engineer Officer Class III CoC (propulsion power 750 kW – 3000 kW)
2.5* Chief Engineer Officer Class III CoC (propulsion power 750 kW – 3000 kW)
2.6 Marine Engineer Officer Class IV NCV CoC (750 kW – 3000 kW)
2.7 Marine Engineer Officer (SEO) Class III NCV CoC (750 kW – 3000 kW)
2.8 Marine Engineer Officer (CEO) Class III NCV CoC (750 kW – 3000 kW)
2.9* Marine Engineer Officer (SEO) Class II NCV CoC (3000 kW – 8000 kW except tankers)
2.10* Marine Engineer Officer (CEO) Class I NCV CoC (3000 kW – 8000 kW except tankers)

*** Subject to the gazette notification of the category of grades.**

Certification for Certificate of Competency under para 2 shall be as per the approved training, assessment and examination as specified for different streams of entry by the Directorate General of Shipping.

The following flow diagrams are attached as annexure explaining progression in various streams.

4.1 NCV Stream upto 3000 kW (as per Section A-III/1 & Section A-III/3 as applicable to NCV) - **Annexure I**
4.2 NCV Stream 3000 kW to 8000 kW (as per Section A-III/2 as applicable to NCV) - **Annexure II**
4.3 Certification as CEO and SEO on ships between 750 - 3000 kW (under Section A-III/3) - **Annexure III**
4.4 Foreign Going Streams under STCW Code Section A-III/2 (3000 kW and more) & Section A-III/3 (750 kW – 3000 kW) - **Annexure IV**

4.5 NCV Refresher & Updating Training from STCW 1995 to STCW 2010 - **Annexure V**

4.6 Detailed syllabus – **Annexure VI**

5. A DGS circular No. 02 of 2012, File No. ENG/STCW-52(2)/2011 on "Refresher & Updating Training course (Upgradation course)" dated 12.01.2012 has already been issued by this Directorate for transition of existing certificates of competency of Marine Engineer Officers (FG) for compliance to the amended Convention and it has been decided that the same would be applicable for the NCV stream as well.

6. All other requirements are as per the DGS guidelines.

7. This issues with the approval of the Director General of Shipping and ex-officio Additional Secretary to the Government of India, under the power conferred in the Chapter IX - Rule 47 of the Merchant Shipping (Standards of Certification & watch keeping for Seafarers) Rules, 1998.

Sd/-
[D. Mehrotra]
Dy. Chief Surveyor

Encl:
Annexure I - NCV Stream upto 3000 kW (as per Section A-III/1 & Section A-III/3 as applicable to NCV)
Annexure II - NCV Stream 3000 kW to 8000 kW (as per Section A-III/2 as applicable to NCV)
Annexure III - Certification as CEO and SEO on ships between 750 – 3000 kW (under Section A-III/3)
Annexure IV - Foreign Going Streams under STCW Code Section A-III/2 (3000 kW and more) & Section A-III/3 (750 kW – 3000 kW)
Annexure V - NCV Refresher & Updating Training from STCW 1995 to STCW 2010
Annexure VI - Syllabus related to Annexure II

To,
1. All Maritime Training Institutes
2. All Academic Councils
3. The Principal Officer, Mercantile Marine Departments, Mumbai/Kolkata/Chennai/Kochi
4. The Shipping Masters, Mumbai/Kolkata/Chennai
5. Chief surveyor with the Govt. of India
6. Nautical Adviser to the Govt. of India
7. INSA, FOSMA, MASSA
8. Training Branch
9. Computer Cell
10. Hindi Cell
11. PS to DG's kind information
12. Guard File

Annexure-I

NCV Stream upto 3000 kW

(As per Section A-III/1 & Section A-III/3 as applicable to NCV)

Eligibility letter from MMD for attending course

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4 Months course covering A-III/1 as applicable to NCV read with A-I/3

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Pass (Part A) written examination conducted by administration / authorized body

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Complete 3 Advanced safety courses (Advanced Fire Fighting / PSCRB / Medical First Aid)

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8 months Sea-service with approved TAR book of Trainee Engineer NCV

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Pass (Part B) oral examination at MMD & award of MEO Class IV NCV CoC

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12 Months approved Sea-service

* Note: Candidate can attend 2 months Part A course & pass Part A Exam at any stage after getting MEO Class IV NCV CoC

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2 months (Part A) & 4 months (Part B) courses for SEO NCV upto 3000 kW covering Section A-III/3 of STCW Code as applicable to NCV*.

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Pass written examination (Part A & Part B) conducted by administration / authorized body

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Pass oral examination at MMD & award of MEO Class III SEO NCV (750 – 3000 kW) CoC

→ **Change over to 3000 – 8000 kW NCV stream under Section A-III/2 as applicable to NCV**

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12 Months approved Sea-service

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2 Months course for CEO NCV upto 3000 kW covering Section A-III/3 of STCW Code as applicable to NCV + **Approved Simulator Course**

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Pass written examination (Management Level) conducted by administration / authorized body

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Pass oral examination at MMD & award of MEO Class III CEO NCV (750 – 3000 kW) CoC

Upgradation of existing NCV CEO 3000 to 8000 kW NCV Stream

Annexure-II

NCV Stream 3000 kW to 8000 kW
(As per Section A-III/2 as applicable to NCV)

MEO Class III CEO NCV (750-3000 kW)

MEO Class III SEO NCV (750-3000 kW)

MEO Class IV CoC
+ 12 months approved sea service

4 months Preparatory Course for MEO Class II (Second Engineer Officer) (NCV) (3000 – 8000 kW – Except Tankers) + **Approved Simulator Course**

Pass written Examination conducted by Administration / Institute of Marine Engineers, India (as per Syllabus mentioned in Annexure VI)

Exempt / Pass MEO Class II Part A Examination by Administration

Pass written examination for MEO Class II SEO NCV (3000 – 8000 kW – Except Tankers)

Approved 18 months sea service while holding MEO Class III CEO NCV (750-3000 kW) as Second Engineer / Chief Engineer (OR) 3 months sea service** as Operational level Engineer on ships of 3000-8000kW (except tankers) with 12 months approved sea service as Second Engineer / Chief Engineer while holding MEO Class III CEO NCV (750-3000 kW)

For Class III CEO/ SEO NCV (750 – 3000 kW) 3 month sea service ** as operational level engineer on ships 3000 – 8000 kW (except tankers)

** - CoC to be endorsed for eligibility upto 8000 kW for NCV CoC holders for Operational level

Pass Oral Examination for MEO Class II SEO NCV (3000 – 8000 kW – Except Tankers)

Award of MEO Class II SEO NCV (3000 – 8000 kW – Except Tankers) CoC

Approved 24 months sea service / 18 months if sailed as Second Engineer for 12 months while holding MEO Class II SEO NCV (3000 – 8000 kW – Except Tankers)

2 months course for CEO NCV upto 8000 kW covering Section A-III/ 2 as applicable to NCV + **Approved Simulator Course**

Pass Written Examination (Management Level) conducted by Administration/ authorized body

Pass Oral Examination for MEO Class I CEO NCV (3000 – 8000 kW – Except Tankers) by Administration

Award of MEO Class I CEO NCV (3000 – 8000 kW – Except Tankers) CoC

Annexure-III

Certification as CEO and SEO on ships between 750 kW - 3000 kW (under Section A-III/3 of STCW Code for foreign going ships)

MEO Class IV CoC

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12 months approved sea service

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Exempt / Pass MEO Class II Part A Examination by Administration*

*Note: Candidate can pass MEO Class II Part A Examination at any stage after getting MEO Class IV CoC

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4 months Preparatory Course for MEO Class III SEO (750 – 3000 kW) + **Approved Simulator Course**

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Pass written examination for MEO Class III SEO (750 – 3000 kW) Written Examination by Administration / Authorized Institute

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Pass Oral Examination for MEO Class III SEO (750 – 3000 kW) by Administration

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Award of MEO Class III SEO (750 – 3000 kW) CoC

↓

12 months approved sea service

↓

2 months preparatory course for CEO (750 – 3000 kW) + **Approved Simulator Course**

↓

Pass Written Examination MEO Class III CEO (Management Level) conducted by Administration / Authorized Institute

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Pass Oral Examination for MEO Class III CEO (750 – 3000 kW) CoC by Administration

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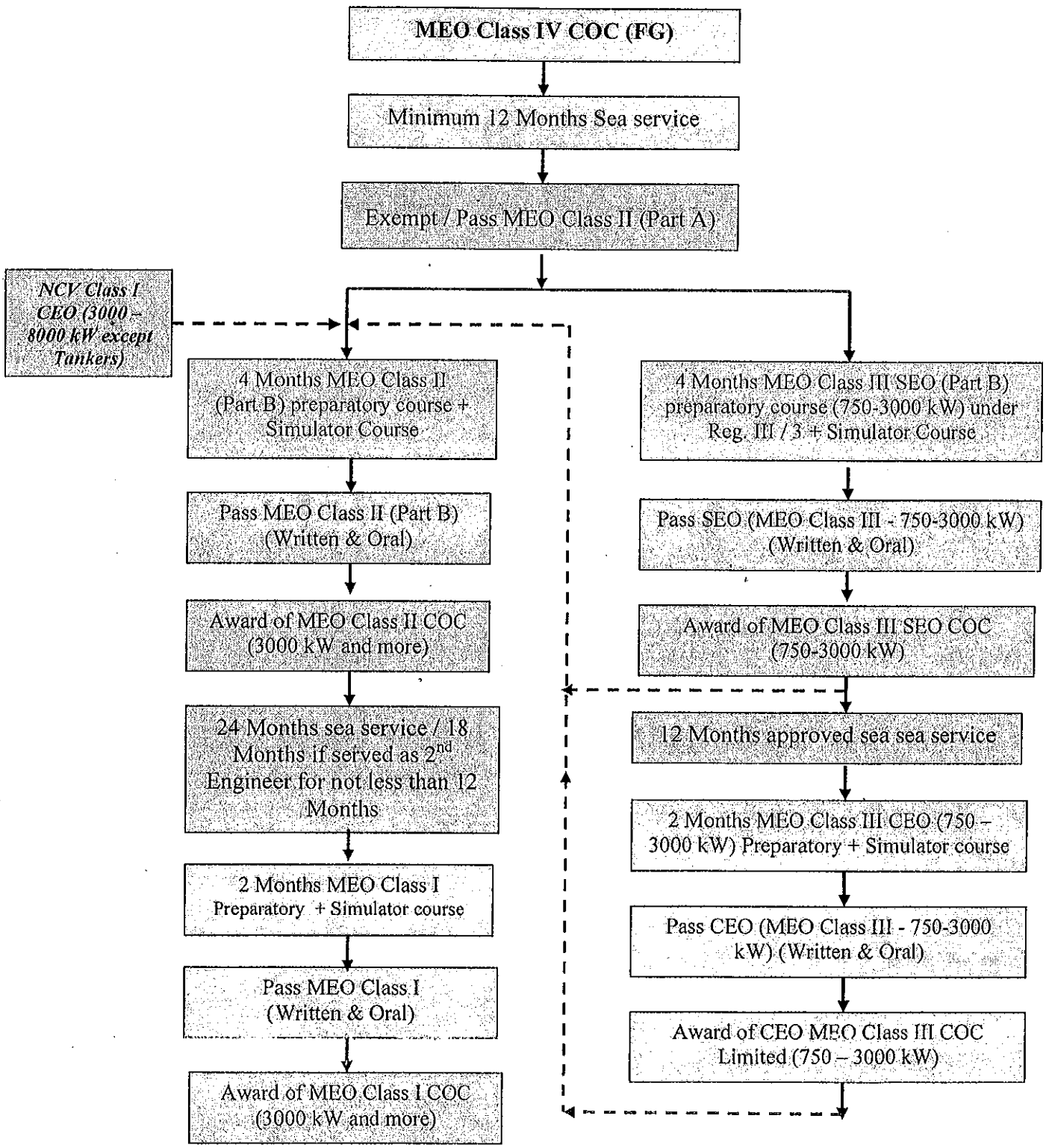
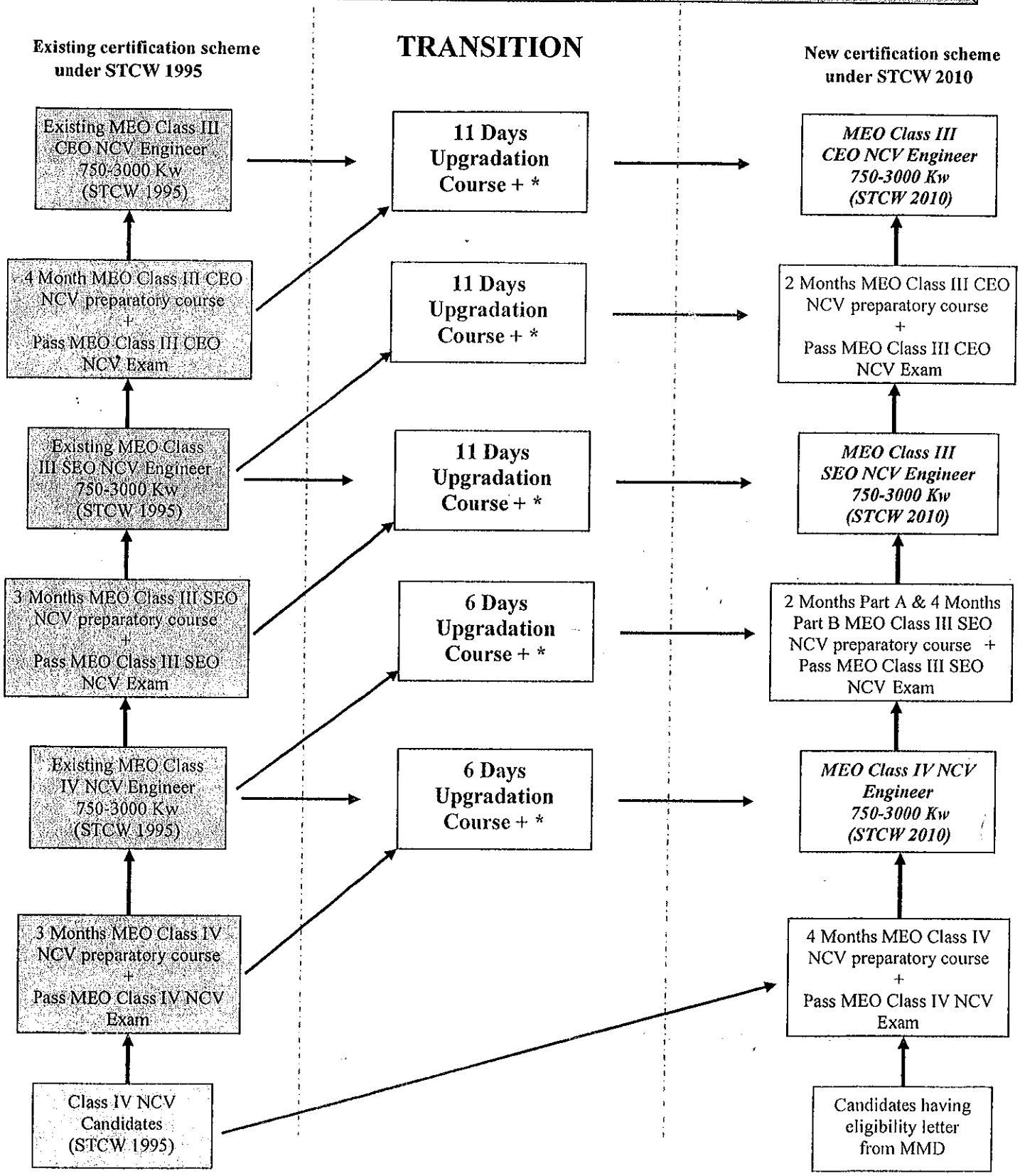
Award of MEO Class III CEO (750 – 3000 kW) CoC

Annexure-IV

Foreign Going Streams under STCW Code Section A-III/2 (3000 kW and more) & Section A-III/3 (750 kW - 3000 kW) & Bridging of NCV Stream with FG Stream



NCV Refresher & Updating Training from STCW 1995 to STCW 2010



Please refer MS STCW Rules and META manual Volume I for sea service requirements.

(*) In addition to the Upgradation course, candidates are required to undergo modules on refresher training for PST, PSCRB, FPFF and AFF. Candidates are also required to undergo Security Training for designated persons, or Ship Security Officer Course where applicable.

27/6/11 MD

PAPER I : MECHANICS AND HYDRO MECHANICS

Mechanics and Hydromechanics –
Theoretical Knowledge - Statics, Dynamics, Friction, Balancing, Simple Harmonic Motion, Stress & Strain, Bending of Beams, Torsion, Struts, Combined Stress, Stresses in Thick Shells, Fluid Mechanics.

1. **Statics** - Bow's notation, Force analysis by method of sections, framed structures.
2. **Dynamics** - Equations of motion, Velocity and acceleration diagrams, Laws of conservation of energy and momentum, Collision of rigid and elastic bodies, Projectiles, Engine mechanisms, Flywheels, Hoists, Cams, Governors, Simple and epicyclic gear systems, Vehicle dynamics.
3. **Friction** - Sliding friction on horizontal and inclined planes, Cotters, Screw threads, Belt drives, Friction brakes, Plate and cone clutches.
4. **Balancing** - Primary and secondary forces, Primary and secondary couples, Complete balancing of reciprocating machinery.
5. **Simple Harmonic Motion** - Equation of simple harmonic motion, Amplitude, frequency and periodic time, Vibrating spring mass systems, Springs, Resonance, Transmissibility, Vibrations of flywheels and gearwheels.
6. **Stress & Strain** - Stress and strain relationships in thin cylindrical and spherical shells, Stress in thin, rotating rims, Thermal stress, Stress in compound bars, Elastic strain energy, Stresses due to gradually applied and shock loads.
7. **Bending of Beam** - Shear force and bending moment diagrams, Fundamental bending equation, Bending stresses, Deflection of beams. Macaulay's method.
8. **Torsion - Stress**, strain and strain energy due to torsion, Fundamental torsion equation, Reciprocating engine crank effort, Rudder stock turning moment from steering gear, Deflection of helical springs.
9. **Struts** - Euler's formula, Slenderness ratio.
10. **Combined Stress** - Stresses on an oblique plane, Material subjected to two perpendicular stresses, Axial and bending stress, Mohr's stress circle. Principal stresses and strains, Combined bending and twisting.
11. **Stresses In Thick Shells** - Lame's equations, The Lame Line, Shrinkage allowance.
12. **Fluid Mechanics** - Volume and mass flow, Venturi meter, Bernoulli's equation, Jets. Orifice coefficients, Dynamic and kinematic viscosity, Reynolds' number, Flow losses in pipes and fittings, Darcy's formula, Centrifugal pumps.

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PAPER II : THERMODYNAMICS AND HEAT TRANSMISSION

Thermodynamics and Heat Transmission -
Theoretical Knowledge - Thermodynamic Fundamentals, Perfect Gas, Second Law, Gas Cycles/Engine Analysis, Properties of Vapours, Steam Cycles, Steam Turbine Velocity Diagrams, Refrigeration, Combustion, Compressors, Heat Transfer, Air Conditioning.

1. **Thermodynamic Fundamentals** - System and working substance, SI Units. Property and State, Reversible and Irreversible processes, Reversible work of compression or expansion, First Law applied to non-flow and flow processes, Throttling, nozzles and mixing of streams.
2. **Perfect Gas** - Equation of state, Specific heat, internal energy, Adiabatic, polytropic, isobaric and isothermal compression/expansion, Enthalpy, Gas mixtures and Daltons Law of partial pressures.
3. **Second Law** - Classical statements, Heat engine, Thermal efficiency, Entropy, Isentropic process, Reversible heat engine, Temperature – entropy (T-s) diagram for a perfect gas, Isentropic efficiency.
4. **Gas Cycles/Engine Analysis** - Constant pressure and constant volume air standard cycles, Reciprocating internal combustion engine performance parameters, indicator diagrams, power, mean effective pressure, thermal efficiency, brake specific fuel consumption, mechanical efficiency, energy balance, Open and closed gas turbine systems, Power, isentropic efficiency and thermal efficiency for gas turbines.
5. **Properties of Vapours** - Saturation, dryness fraction and superheat, T-s, p-h, p-v, h-s diagrams, Fluid properties using steam tables, Throttling and separating calorimeters, Air in condensers.
6. **Steam Cycles** - Rankine cycle. Turbine isentropic efficiency, Feed heating, Thermal efficiency, Cycle on T-s diagram,
7. **Steam Turbine Velocity Diagrams** - Principles of reaction and impulse turbines including compounding, Velocity diagrams, Nozzle steam velocity (excluding proof of critical pressure ratios), Force and work done on blades.
8. **Refrigeration** - Vapour compression cycle, Refrigerant properties and hazards, Refrigerant tables, Cycle on p-h diagram, Coefficient of performance, Refrigerant mass flow, Compressor calculations, Secondary refrigerants.
9. **Combustion** - Combustion equations, Fuel composition, Air-fuel ratio, Excess air, Volumetric analysis of combustion products, Calorific value.
10. **Compressors** - Reciprocating compressors: Operating principles, volumetric efficiency, free air delivery, power, mechanical efficiency, isothermal efficiency, multi-stage and inter-cooling, p-V diagram, Positive displacement rotary compressors: Operating principles, power, efficiency.
11. **Heat Transfer** - Conduction, radiation and convection, Composite walls. Insulation, Film coefficient, Interface temperature, Stefan-Boltzmann Law, Parallel flow and cross flow heat exchangers, Logarithmic mean temperature difference.
12. **Air Conditioning** - Comfort conditions, Psychrometric charts, Wet and dry bulb temperatures, Humidity, Dew point, Dehumidifying and humidifying processes, Air conditioning systems.
13. **Heat Cycle**, Thermal Efficiency and Heat Balance of Marine diesel engine, Marine steam turbine, Marine gas turbine, Marine steam boiler.

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