社会開発協力部報告書

フィリピン共和国
国立航海技術訓練所研修センター
計画打合せチーム報告書

昭和60年10月

国際協力事業団

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序

フィリピン国においては，多数の船員労働力を外国船に供給しているが，近年，各国の海運界では，船舶の安全運航，安全基準に関する所定の知識及び技能の修得が必要とされその資格要件を欠く船員は外航船の乗船が困難になっているため，フィリピン国船員の船舶運航技術のレベルアップを図ることが焦眉の急とされている。

このため，フィリピン政府は，１９７８年５月１日発令の大統領令第１３６９号により，船員の再教育機関として，国立航海技術訓練所（National Maritime Polytechnic）を設立し，特別技能教育を実施してきたが，STCW条約等に規定された知識及び技能を修得せしめるための教育を行うには，施設，機材及び教育スタッフが十分に整備されていないことから，フィリピン政府は，本訓練所の拡充計画を策定し，その実施について，わが国に対し無償資金協力及び技術協力を要請してきた。

これを受けて，日本国政府は，昭和５８年８月以降，無償資金協力及び技術協力に係る各種調査チームを現地に派遣し，フィリピン政府関係者と必要な事項につき協議を重ねてきたところ，昭和６０年６月に，実施協議チームとフィリピン政府関係者との間で署名交換された討議議事録（R/D）及び暫定実施計画（TSI）に基づき，フィリピン国立航海技術訓練所研修センターに係る技術協力が実施される運びとなった。

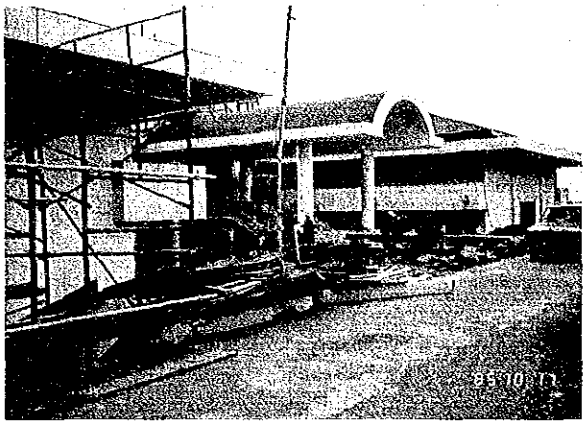
上記R/Dに基づき当事業団は専門家チームを昭和６０年１２月に派遣する予定であるが，専門家が現地着任後，速やかに円滑な協力活動を開始するためには，カリキュラム及び教材の作成について，先方関係者と具体的な調整を行う必要があるところ，今般，プロジェクトリーダー予定者である運輸省航海訓練所教授佐野修氏を団長とする計画打合せチームを昭和６０年１０月１４日より１０月２０日まで，現地へ派遣し，フィリピン国政府関係者と協議を行った。

本報告書は，計画打合せチームの現地における調査結果をとりまとめたものである。

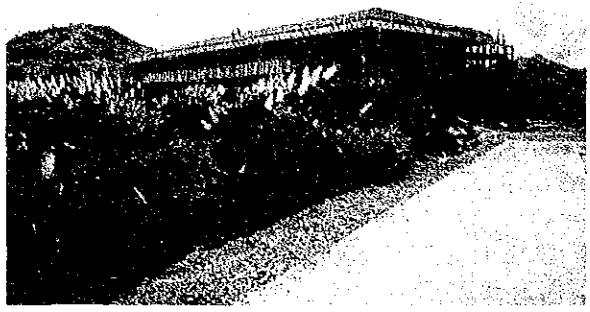
おわりに，計画打合せチームの諸氏のご協力並びに外務省，運輸省及び在フィリピン日本大使館その他の関係機関の方々に対し，深甚の謝意を表するとともに，関係各位の今後のご支援をお願いする次第である。

昭和６０年１０月

国際協力事業団
理事 中澤弐仁



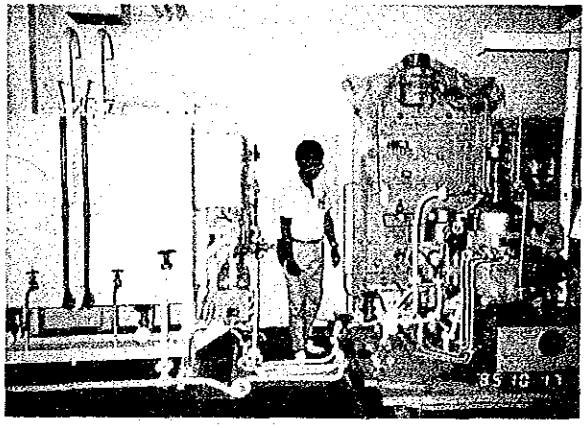
(研修センター　航海・機関訓練棟と中央入口)



(タクロバン・サイト・事務棟とキャンパス内の道路)

(教室地区を越えて訓練センターの屋根と入口の円形屋根がわずかに見える。)

(比国側が整備し始めている教室内では仮事務室が開設され総務部が活動し始めている。)



(研修センター内機器（例. 油清浄機）の据付が開始されている。)

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(1) NMP Rostor of Personnel, Taclban City

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(4) Curriculum for the Upgrading of Masters and Chief Mates

(5) Third and Fourth Engineers' Upgrading Course

(6) Curriculum for Radar Simulator Course（RSC）

(7) 各コース開講スケジュール（案）

1. 計画打合せチーム の派遣

1－1 計画打合せチーム派遣の背景：

本年6月，実施協議チームを派遣し，本プロジェクトに係る日本側及びフィリピン側の投入計画及び先方の実施体制等を確認するとともに，本プロジェクトの基本構想案及び暫定実施計画案について協議，協力内容を確定し，討議議事録（R/D）に署名を了したが，この際，昭和58年8月の事前調査に基づく当初案を若干変更することになった。その主要点は次のとおりである。㊟

(1) 訓練センターの設置目的

訓練センターの設置目的を「STCW条約の要求する知識及び技術について，各職位（所有免状）ごとに再教育を実施し，さらに上級の海技免状を取得すること」から，「知識が重視され，実務経験や技術技能が十分でない海技免状所有者が多く，……主として，海技免状（を既に）所有（している）者の実務経験不足を補完し，STCW条約に適合するよう質の向上を図るための実習を中心とした再教育訓練を行うこと」とした。

(2) 訓練コースのフレームワーク

向上コースについては，海技免状取得に必要な理論・知識は一応保有しているものとして，実習に重点を置いた訓練としたことにより，当初案の訓練期間20週間（680時間）を15週間（500時間）とした。

また，訓練密度を上げて（比国側は，海上労働の原則1日8時間，但し，土，日曜日は自学自習をしたい模様である）可能な範囲で訓練期間を短縮したいとするフィリピン側の事情等を考慮して，訓練期間の短縮に同意した。

(3) 各コースの訓練目標

各コースの訓練目標については，各海技免状に応じて定められているSTCW条約の求める知識及び技術の習得とし，同条約の付則を含めて総括的表示とした。

(4) 各コースの開講時期

訓練機材には，多数の電子・電気機器が含まれており，これらを据付後長期間不稼動状態にしておくことは，機器の性能維持上好ましくないことなどの理由の他に据付後1か年

㊟（実施協議チーム報告書「R／D討議交渉経緯及び調査概要」参照）

間の機器の保証期間中に各コースにつき一通りの訓練過程を終了したいとのフィリピン側の早期開講の希望が強く表明された。フィリピン側負担工事の進捗状況及びカウンターパートの確保状況ならびに日本側専門家の派遣時期等も考慮して，早期開講を可能と判断し，訓電を受けて，開講時期を次の如く変更した。

コース名	当初開講時期	変更開講時期
向上コース		
2／M，3／M，3／E，4／E	1987年 4月	1986年 8月
M／M，C／M，C／E，2／E	1988年 4月	1986年12月
特別コース		
タンカーセーフティ	1988年 1月	1986年6月より
その他	1986年12月	（試行開講）

(5) 比側カウンターパート

本プロジェクトの効果的実施のために，重要な役割りを持つ比側カウンターパートについて，日比双方で十分に協議した。その資格要件，海上実歴等を定め，カウンターパートの確保に必要な比国の経済的な支援措置を要望し，比側は実施方を約した。

(6) 本プロジェクトの組織

研修センターの設置目的を達成し，技術協力が有効に機能するよう種々論議の結果，付属書第7章に示す組織となった。当初案に対して，比側にもコーディネーターを加え，日，比のコーディネータ間で緊密な連絡をはかることとし，メンテナンス部門を航海，機関及び特別コース部門と同列に置いて充実させ，訓練機材の良態保持と活用を図ることとした。これらの変更点への対応は，本プロジェクトの目的の成否に重大な影響を及ぼすものと思料されることから，日本側専門家等の派遣時期以前に再度確認調整することが望ましい。

1－2 派遣目的：

上記背景に鑑み，専門家チームが現地着任後，速やかに円滑な協力活動を展開するためには，カリキュラム・教材作成計画，カウンターパート受入れ計画，機材供与計画及び訓練実施計画等，フィリピン側の訓練コース開講への対応状況を確認し，先方関係者と協力活動の取り進め方について，意見交換することが必要であり，併せて，派遣専門家の生活基盤整備のための調査を行うことを目的として，計画打合せチームを派遣したものである。

1－3　チームの構成：

(1)　佐野　　修　（総　　括）　運輸省航海訓練所研究調査部付教授（本プロジェクト研修センターチームリーダー予定者）

(2)　金子　節志　（協力企画）　ＪＩＣＡ社会開発協力部海外センター課課長代理

1－4　調査日程：

月　日	曜日		
10／14	月	東　京→マニラ	移動（ＰＲ４３１） （10：15成田発　13：30マニラ着）
		ＪＩＣＡ事務所	表敬並びに調査目的及び対処方針説明（御手洗所長，岡崎所員）
		在フィリピン日本大使館	表敬及び調査内容打合せ （新行内一等書記官）
10／15	火	National Maritime Polytecnic （NMP）	表敬及び調査日程協議 各コース開講スケジュール案提示，協議予算措置状況確認 （Executive Vice President Capt. H. T. Domingo 以下 Staff ）NMP機関誌（隔月刊行）1か年分6冊入手）
10／16	水	Mandarin Hotel マニラ→タクロバン	比側提示の資料調査 移動（ＰＲ１９３） （17：30マニラ発 18：40タクロバン着）
		Park Hotel	調査日程協議 （松田平田坂本建築設計事務所 森田駐在員 鹿島建設株式会社プロジェクトマネージャー　矢口弘康 石川島播磨重工K. K マリンコンサルタント　門田　諫

10／17	木	ＮＭＰプロジェクトサイト Divine Word大学 Park Hotel タクロバン→マニラ	ＮＭＰ訓練スタッフ現状聴取，協議 無償資金協力建設工事現場視察及び フィリピン側準備状況聴取 表敬訪問 （Vice Psesident for Academic Affairs） 住居借上げ折衝 （Comptroller E. Costibolo） 移動（ＰＲ１９４） （１９：００タクロバン発 ２０：３０マニラ着）
10／18	金	ＮＭＰ	カウンターパート配置状況調査 カリキュラム討議
10／19	土	Mandarin Hotel	比側提示のカリキュラム調査報告書 素案作成協議
10／20	日	マニラ→東　京	移動（ＮＷ００４） （０９：３５マニラ発 １４：３５成田着）

1－5　主要面談者リスト

No.	氏　　名	現　　職
1	Capt. H. T. Domingo	EVP of NMP （実施協議チーム報告書参照）
2	Capt. R. P. Barongan	VP（－〃－）
3	Capt. S. Torreo	VP（－〃－）
4	Capt. E. Guiuto	AVP（－〃－）
5	Capt. A. E. Subijano	AVP（－〃－）
6	Capt. E. Campo	AVP Special Courses
7	Capt. S. Kangleon	AVP Gen. Service
8	Dr. E. M. Cinco	Head Instructor
9	Mr. E. Costibolo	Maritime Leaderships & Behavior Leyte Park Hotel, Comptroller
10	新行内　博　幸	一等書記官
11	御手洗　章　弘	ＪＩＣＡマニラ事務所長
12	岡　崎　有　二	ＪＩＣＡ担当
13	森　田　達　弥	松田平田坂本建築事務所コンサルタント
14	矢　口　弘　康	（鹿島建設株式会社）
15	戸　田　正　豊	（　〃　）
16	藤　沢　昭　文	（　〃　）
17	門　田　　諫	石川島播磨重工株式会社 海外事業部マリンコンサルタント室副部長
18	宮　崎　良　彦	〃　調達室課長
19	小　川　純　二	〃　東南アジア部

2. プロジェクトの準備状況

2－1 カウンターパート等の配置状況

(1) カウンターパート等配置人名表㊟

NMP研修センター関係の調査時点での配置人名表は，比国側からNMP Roster of Pessonnel, Tacloban City として提出されたが，この中，President, Capt. TanedoはM／S Filipinas の航海に従事しているため不在であったが，Exec. Vice President Capt. Domingo以下，全Vice President 及びAssistant Vio President が今回の調査時の協議ないしは討議に参画した。

(2) カウンターパートの我が国における研修開始

Asst Prof のうち航・機それぞれ２名づつが本プロジェクトのカウンターパートとして１０月中旬から約２か月半の日本における研修を開始したが，日本側専門家がタクロバンに赴任する１２月中旬を目途に帰国し，日本側専門家とともに研修センターの教育機材据付けに従事して，１９８５年３月末の無償資金協力による建物及び教育機材の受け取りに万全を期す予定になっている。

(3) レイテ島タクロバンサイトの現状

タクロバンのサイトには，Asst. V. P. Capt. Campo が既に特別コースの訓練に従事しているほか，今回はAsst. V. P. Capt. Kangleonが総務部（女子職員１０名ばかり）を指揮していたばかりでなく，現地視察調査には，V. P. Capt. Barongan が常に同道し，現地機関を案内した。

また，Head Instructor, Maritime Leadership & Behavior Dept. のDr. Cinco が以前に教鞭を取ったことのあるDivine Word大学への表敬案内，専門家子女の入学，教育等について口添えし，極めて頼もしく，前回，NMP研修センターの地方教育機関又は地域社会との連携を提案しておいたところであるので，まず，第一歩が踏み出されている感が深い。

(4) カウンターパート採用選抜状況

比国側がカウンターパートを採用するにあたっての準備，広募，試験等について

㊟付属資料参照

A Summary of the procedures in the selection of NMP Instructors㊟が資料として提示されたが　真剣な取り組み方が十分に推察される。

(5)　比側コーディネーター等の現状

以上のことから，カウンターパート等，人的配置は現在のところ懸念すべきところはない。

しかしながら，本プロジェクトの組織として，R/D の付属書第７章に示した「比側にもコーディネーターを加え，日比のコーディネーター間で緊密な連絡をはかること。」としたコーディネーターについて，無償資金協力推進の第一人者であったと推察される行政事務に堪能であったVice President of Research Planning of the Project の Mr. Oca が指名されず，Exec. Vice Precident のCapt. Domingo が指名された模様である。本件については，技術協力面，特に教育訓練に重点を置き，Capt.職経験者を指名するという本来目的を重視した人事を思料されるが，今後，摩擦が起らぬよう十分の配慮が必要と思われるので，こゝに付記する。

２－２　比側負担の機材、設備等の準備状況：

(1)　機材供与の希望状況

技術協力に関わるコロンボプランＡ４フォームによる機材供与希望については，オーバーヘッドプロジェクター，１６㎜映写機等相当量に上っているが，協力期間４か年間に順次供与できるものと思われる。しかし，この中には黒板，ファイリングケース等比国側で当然準備すべき機材を考えられるものも含まれていたので，十分に協議し，比国の努力すべき事項について指摘した。

(2)　校舎等の整備状況

一方，タクロバンの訓練サイトの校舎は，先回６月に視察した時には，前年来襲した台風による屋根の被害を復旧中であったが，今回は復旧作業も終り，屋根も側壁も新しく塗装替えされていた。

しかしながら，日本側の無償資金協力で設置が予定されているダビット基部の岸壁工事が実施されておらず，（但し，護岸工事は完成している）工事を急ぐよう要請した。

なお，１９８６年早々，オフイサー用寮を建設，着工する予算が認められたとのことで

㊟付属資料参照

ある。

現在，着々と進められている我が方の無償資金協力による訓練棟及び事務管理棟が完成し，前述の寮等が建設されれば日比友好道路の架橋，マルコス・ブリッジ・サイドに素晴らしいキャンパスが出現するものと思われる。そこに設置されるシミュレーター等についても世界の水準をゆくものと思料され，教育訓練の充実如何のみが問題となりそうである。

(3) 英文専門図書整備の希望㊟

A4フォームによる機材供与希望の中に大量の英文専門書が含まれていたことも見過すことができない。

当初，本プロジェクトを計画するにあたって，日本の最新の航海および機関機器の技術移転を考慮し 最先端の諸機器及びその現象を追縦模擬するシミュレーターを無償資金協力で設置し，これらの機器の英文マニュアルによって技術移転を行なおうとしたものと思われる。現在でも，これは，なお妥当な手法と考えられる。

しかしながら，これらの先端技術を理解研究するのに不可欠であるこれらの英文専門書は，教育的には英語圏にある比国側が用意するものと予測していたのであるが，研修センターとしての原点にかえって考えると，これらの要望英文専門図書については，研修センター付属図書として少くとも専門家用（若しくは教官用）及び研修生用の二組は準備することが適当と思料される。

この準備手法としては，専門家の携行機材の中にできるだけ含めることを考慮しつゝ，更に教官を中間技術者に見たて，比国船員同様再教育することを目途に予算措置を講じたいものであり，比国船員の資質の向上のためには，その初期導入教育の充実が不可欠と思われるので，当初目的の既成船員の再教育訓練が開始される前であるが，あえて，こゝに付言し，格段の配慮を願うものである。

㊟付属資料参照

3. 訓練コース実施準備状況

3－1 一般的準備：

比国船員の資質の向上，再教育訓練の必要性についての認識は極めて高い。ＮＭＰでは隔月発行の機関誌〝VOYAGES〟を発行しているが，過去１か年間のVol.2 №1～№6の6部を通読したところでは，比国船員問題の解説，比国船員教育の提案，我が国との技術協力の現状報告等が含まれ，その論調は，我々日本側専門家にも参考となるものが少くない。船員教育への意識は，十分に高まっているものと推察される。

3－2 カリキュラム等の準備状況：

カリキュラムについては，既に全コースについて検討が開始され，第一次案がタイプアップされていた。日本側専門家が準備でき次第，いつでも協議に入れる状況にある。

これについては，Vice Presicent クラスが米国キングスポイトの留学生乃至は比国商船大学の出身者であり，航・機両科の科長と目されるAssist Vice President は航海科がＭＩＴ出身，機関科がKuigs Point出身で，いずれもM／S Filipinas受取りにともなうデンマークに於ける６か月の研修を受けている。

したがって，教育技法カリキュラムの編成等は米国的な感覚で処理し，或いは，日本の専門家の域を越えているかもしれない。その中に，如何に我が国の技術を移転していくか，専門家の責任も重い。

＜各訓練別カリキュラム準備状況＞

1. 向上コース：

(1) 航海課程

i 船長 ii 一等航海士	}	①同一カリキュラム準備済
iii 二等航海士 iv 三等航海士	}	②同　　上

(2) 機関課程

i 機関長 ii 二等機関士	}	③同一カリキュラム準備済
iii 三等機関士 iv 四等機関士	}	④同　　上

2. 特別コース：

(1) レーダー観測　　⑤準備済

(2) レーダープロッティング　⑥準備済

(3) レーダーシミュレーター　⑦ 〃

(4) タンカーセイフティ　⑧ 〃

(5) 危険物貨物　⑨ 〃

(6) 航内医術　⑩ 〃

(7) 消火訓練　⑪

3. その他

(1) 海上サバイバル　⑫

(2) ラジオ通信　⑬

(3) 電子航法　⑭

(4) 気象　⑮

(5) レイテングのための航海当直法　⑯（同左テキスト案⑰）

(6) レイテングのための機関当直法　⑱

3－3 各コースの開講時期

各コースの開講時期について，R/Dに基づき一応のスケジュール案㊟を示し，比国側の準備方を督促したが，一等航海士と，船長課程及び二等機関士，一等機関士課程について，クリスマス休暇明けの１９８７年１月に順延するほか，大要において合意した。

㊟付属資料参照

4. 専門家の生活基盤整備

4－1 住　居：

住居は，安全第一を考慮し，当初は，レイテ，パーク・ホテルのコッティジの借り上げを目途に赴任後契約するが，赴任時，ダブルスイート２室のコッティジ５棟の借り上げが可能である。

借り上げ費については，ＪＩＣＡ住宅手当の範囲内で契約可能と見込まれる。

この場合，専門家の集会所，プロジェクトのカウンターパート等との会合場所に欠けることになるので，チームリーダーの住宅手当等の余剰等を考慮して，船舶の士官サロン（配膳室パントリーを含む）乃至は船長公室を模して，クラブコッティジ１棟を追加借り上げることを考慮するのも一法である。

4－2 教育機関：

タクロバンの私立Divine Word大学（付属小学校，高等学校を含む）への入学については，進度，語学力を考慮の上，特段の配慮をするとの副学長の口答を受けている。

なお，当校で教鞭を取ったことのあるＮＭＰの専任教授Dr.Cinceがこの席に同道し，その際の口添役を果すと申し出ていたことを付記する。

ＮＭＰの地域社会との結びつきも，一歩一歩進めてゆく必要があることは申すまでもない。

5. 提　言

本プロジェクトに対する無償資金協力は，総額３０数億円にのぼるといわれている。最近の我が国の船員教育に対する予算措置と比較すると，この額は新しく代替建造された練習帆船「日本丸」の建造費の５０パーセントを越えている。「日本丸１世」は昭和５年に進水し，以来５０有余年我が国の船員教育に尽遂した。その実績と今後の５０年を見越しての代替建造認可であった。

このことを考えあわせると，本プロジェクトは永い将来にわたって，フィリピン船員の資質を向上し，船員の本国送金を通じてフィリピンの国際経済基盤に寄与するばかりでなく，世界海運の安全を確立し，海洋を汚染から守るものでなければならない。

幸い，フィリピン側の対応は現在迄のところ適切であり，意識も極めて高い。しかしながら，こゝに投入された電子・電機機器の保守，管理を考えると初期投資のみで済むものではない。

一般的に，各種シミュレーターの維持管理は，毎年，設備費の少くとも２～３パーセントの開放点検費を見込む必要があるとされている。仮に，電算機構部分に１０億円が投入されているとすれば，この開放点検費のみでも，２～３千万円を計上しなければならない。その上に，故障箇所の修理を考慮すれば，比国側の今後の対応は並々ならぬものが要求される。

そこで，現時点に於いて次のことを提出したい。

(1) 比国の維持管理費の計上

当プロジェクトの訓練機器の受取りは，１９８６年３月末が予定されているが，幸い，商慣習上，１か年間については機器の正常運転と正常運転に係わる補修費が，保証工事として，日本側メーカーに義務付けられ，技術と部品の提供が約されているので，この間に，十分機器に慣熟させ，かつ，正常運転技術を移転しなければならない。また，１９８７年，保証期間経過後の機器開放点検維持管理費について，比国側に予算措置を講じさせる必要がある。

(2) 前項の維持管理費だけを取っても，財政的に脆弱なフィリピンにおいて，予算化することは極めて困難と思われる。しかしながら，これはコロンボ計画の趣旨からみても是非成し遂げねばならない。

(3) そのためには，我が国においても，本プロジェクトを比国既成船員の再教育訓練機関の域にとどめず，比国船員教育の基礎を担当するフィリピン全商船教育機関の教官の再教育訓練を目途に，中堅技術者養成対策費を予算化し，比国側に国家目的遂行の意義を醸成しつつ，比国側の予算確立を支援する必要がある。

なお，この中堅技術者養成対策費が予算化されるときには，研修センター内に関係専門図書（英文）のコーナーを設置し，本プロジェクトに当する付加資材として要求している，比国側Ａ４フォームの趣旨を尊重し，かつ，技術移転を行う場合のコミュニケーションを容易にすることが望ましい。

(4) 更に，フィリピンにおいては，公用語として英語がタガログ語と併用され，高等教育の場では英語が常用されている。英語が国際語であることに異議をはさむ向きはないと考えられるが，それにも増して世界海運においては英語が常用され，基本語となっている。

このことを考慮すれば，フィリピンは，ＡＳＥＡＮ諸国の第三国研修の場として適切であるばかりでなく，本プロジェクトは我が国の最先端技術を集めたＳＴＣＷ条約対応のシュミレーター船員教育センターと云える。

是非，本プロジェクトの有効活用とＰＲ効果をも含めて船員教育のモデルケース・シンポジュームの場ないしはＡＳＥＡＮ諸国の船員教育第三国研修機関への発展も考慮願いたい。

幸い，各コースとも当初案よりその期間を短縮しているので，施設的にも余裕のあることが予測できる。また，協力期間が４か年に短縮したが，この間に，技術移転の手法も確定するものと思われる。

6. 結　　語

本プロジェクトの意義は極めて高い。その認識は日比相方に醸成されつつある。

事実，本プロジェクトサイトは日々充実，完成に向いつつある。次は，如何に技術移転を行うかにある。

幸い，日本側専門家は，我が国の海運を担う中核会社の協力を得て，その代表技術者（船長，機関長級）で構成されようとしているし，比側コーディネータの資質も我が国と同様遜色はない。絶妙なチームワークのもと，成功に導びかねばならない。

そのためには，今後，本件プロジェクト関係者の絶大なる支援を得ることが不可欠である。

付　　属　　資　　料

(1) NMP Roster of Personnel, Taclban City:

OFFICE OF THE PRESIDENT

	Name		Designation
1.	Benjamin M. Tañedo	-	President
2.	Hermenegildo T. Domingo	-	Exec. Vice President

MARITIME TRAINING COMPONENT

	Name		Designation
1.	Santiago E. Torres	-	VP, Maritime Training
2.	Exequiel S. Campo	-	AVP, Special Courses
3.	Emiliano V. Quinto	-	AVP, Deck Department
4.	Antonio E. Subijano	-	AVP, Engine Department
5.	Jude C. Cortez	-	Asso. Professor, Deck
6.	Rommel T. Gacutan	-	- do -
7.	Alex J. Quilantang	-	- do -
8.	Manuel M. de Leon	-	Assb. Professor, Deck
9.	Genis S. Murallos	-	- do -
10.	Jorge S. Factuar	-	Asso. Professor, Engine
11.	Noel T. Japos	-	Asst. Professor, Engine
12.	Wilson P. Traviña	-	- do -
13.	Dinah R. Gonzales	-	Hd., Testing & Supervision
14.	Elmer E. Pangue	-	Maintenance, Technician
15.	Dr. Exaltacion M. Cinco	-	Hd, MLBO (Mar. Leadership & Beh. Dev't)
16.	Marcelina L. Meneses	-	Instructor, MLBO
17.	Crispo A. Salinas	-	- do -
18.	Melba L. Esquibel	-	Instructor, Ship's Medicine
19.	Dominador V. Bitago	-	- do -
20.	Gil Safronio G. Brasileña	-	- do -
21.	Dominador S. Almonte	-	Instructor, Pref. in Survival Craft
22.	Zacarias G. Rosete	-	- do -
23.	Jesus D. Aquino	-	Instructor, Survival at Sea
24.	Restituto T. dela Flor	-	- do -
25.	Mariano F. Nisperos	-	Instructor, Firefighting
26.	Teofilo R. Nieto	-	- do -
27.	Wilfredo P. Fernandez	-	- do -
28.	Julio P. Muñez	-	- do -

ADMINISTRATIVE & FINANCE COMPONENT

	Name		Designation
1.	Rodulfo P. Barongan	-	VP, Admin. & Finance
2.	Rogelio S. Kangleon	-	AVP, Gen. Services
3.	Evelyn T. Peñaranda	-	Actg. Adm. Officer
4.	Rosita C. Beringuel	-	AVP, Finance
5.	Remedios C. Cagulada	-	AVP, HRD
6.	Eufemio B. Bantugan	-	Hd, Accounting Division
7.	Lucilo C. Cagulada	-	Hd, Budget Division
8.	Yolanda B. Decdec	-	Hd, Cash Division
9.	Doris R. Manuel	-	Hd, Personnel Division
10.	Consolacion C. Estaris	-	Hd, Supply Division
11.	Joselito A. Pacheco	-	Finance Officer

PRPD COMPONENT

	Name		Designation
1.	Abelardo V. Oca	-	VP, PRPD
2.	Antonio C. Lantin-Bella	-	AVP, Maritime Research
3.	Marietta B. Bulawan	-	AVP, Corplan
4.	Marissa C. Acampañado	-	Hd, Mar. Sc. & Tech. Div.
5.	Rey A. Verdelaga	-	Hd, EDP Division
6.	Bayani P. Abella	-	Hd, Proj. Devt. Division

(2) A Summary of the Procedures in the Selection of NMP Instructor :

I GENERAL : With the aim of getting maximum qualified applicants from whom, the best candidates can be selected to composed and/or augment the present NMP faculty staff in connection with the expansion program of the NMP training center under the JICA Grant Aid, the following courses of action were taken:

1. Advertisements were made through the TV, radio and national dailies.
2. Recruting teams were sent to Tacloban City, Cebu City, Iloilo City and Bacolod City.
3. Advertisement posters were placed in different shipping companies, manning agencies and nautical training centers.
4. Theoritical examinations were conducted in Tacloban City, Cebu City and twice in Manila.

II QUALIFICATIONS:

A. Deck and Engineering

a. BS Degree Holder with Teaching Experience
b. Licensed Mariners (Deck or Engine)
c. Sea Experience at least two (2) years
d. Age limit - 45 years old

B. Electronic Technician

a. Graduate of 3 years Electronic Course
b. At least one (1) year experience
c. Age limit - 39 years old

III NUMBER OF APPLICANTS:

a. Deck : 128
b. Marine engineering : 136
c. Electronic Technician : 58

NOTE: Eight Deck Officers eight Engineers and three Electronic Technicians were finally selected based on the results of the theoritical examinations and panel interview.

IV ENCLOSURES:

a. Sample Test Paper for Deck Officers
b. Sample Test Paper for Engineers
c. Panel Interview Format
d. Test conducted for Electronic Technician shown below:

1). IQ test
2). Aptitude test on:

Assembly
Components
Inspection
Mathematics and Reasoning

NATIONAL MARITIME POLYTECHNIC

Exam for prospective lecturers - DECK

Instructions to Candidates :

1. Do NOT turn over this page until told to do so.

2. Do NOT write on the question paper.

3. Do NOT use calculators, slide rules, mathematical tables or other similar aids.

4. Show ALL computations of each question.

5. Diagrams may be drawn in pencil, ALL other work must be done in ballpoint or ink.

6. Answer ALL questions.

7. Time allowed: TWO hours

8. Marks for each correct solution are shown on the question paper.

1. Add $-2.7a + 4\frac{1}{2}b - c$
to $a - 2\frac{1}{10}b - 2c$ (2marks)

2. From $3x - 1000y - z$
subtract $-3x - 17y + 8z$ (2 marks)

3. Simplify $(3a + b)^2 - b(6a + b)$

and also simplify $\frac{3a^2 \times 6ab}{3a}$ (2 marks)

4. Multiply 83×474 (2 marks)

5. Write as a percentage (%) 30 out of 75 (2 marks)

6. Give the exact values of :-

(a) $\sqrt{0.09}$

(b) $\frac{\sqrt{3}}{\sqrt{12}}$

(c) $2 \div \frac{1}{2} + \sqrt{16}$ (3 marks)

7. From the weatherforecast you learn that you can expect wind of speed 20 meters per second.
Convert the speed of the wind to knots. (Nearest whole knot) (3 marks)

8. Solve for x and y

$x = 6 - \frac{6 + 2y}{3} + 2 - 1\frac{1}{3}y$

$2x + 3 = y$ (4 marks)

9. A piece of wood 3.00m long, 50cm wide and 30cm thick is floating in fresh water.
25cm of its thickness is above the waterline.
How many kg of iron must be placed on top of the wood just in order to submerge the piece of wood? (3 marks)

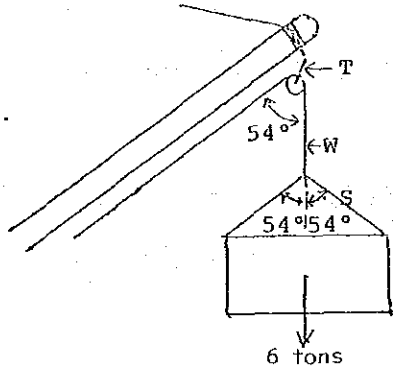
10. A load of 6 tons is carried by the runner in a boom arrangement by means of a sling with two legs.

Angles are shown in the figure.

Calculate the forces S, W and T.

Use :-

$\text{Cos } 54^\circ = 0.6$
$\text{Cos } 27^\circ = 0.9$
$\text{Sin } 54^\circ = 0.8$
$\text{Sin } 27^\circ = 0.45$



(6 marks)

11. The sides of a triangle ABC are all 6m.

Give :-
(a) Sin A
(b) Cos B
(c) Tan C

Use :-
$\sqrt{27} = 5.2$

(3 marks)

12. A crate 4 meters long weighing 64 kg is carried by two men A and B lifting at each end.
The centre of gravity of the crate is 1.5 meters from A.
What is the load of each man? (4 marks)

13. A person bought some notebooks costing 3.5 pesos each and some calenders costing 5 pesos each. He got 18 items and paid 78 pesos.
How many notebooks and how many calenders did he buy? (3 marks)

14. You are at an accurately known position.
The true bearing of a lighthouse is 135°. The bearing by magnetic compass is 136°
The magnetic variation is 6° west.
You are steering 100° by the magnetic compass.
What is the deviation and what is the ship's true heading? (5 marks)

15. You have established your position by cross-bearings using two lighthouses.
The bearings were 45° true and 210° true.
15 minutes later you are establishing your position again - this time by two lighthouses bearing 48° and 315° true.
The distances to all the lighthouses mentioned are between 6 and 7 NM.
A closer look at the two positions gives you reasons to believe that at least one of them is very inaccurate.
Which of the two positions is more likely to be inaccurate? Why? (4 marks)

16. On a certain day you were able to obtain only one observation.
This was a sight of a celestrial body right ahead.
Can you establish the ship's position by this sight?
If "yes" how?
If "no" - can the sight then give you any sort of usefull information?
Which information? (3 marks)

17. As the master of a ship you have taken charge of the navigational watch
You are in an area of restricted visibility in open sea.
The ship's course is 310° true and the speed is 10 knots.
The mate on duty has reported a radar contact on course 300° true at a speed of 12 knots.
The contact is now 3 NM off on a bearing of 070° true.
The plot also shows that the CPA will be 0.3 NM and she will cross ahead of you.
You can not get VHF contact with the ship.
You decide to act now.
Which action will you take?
Give your reasons for this action. (4 marks)

18. A general cargo ship has 9900 tonnes displacement. Her centre of gravity is 5 metres above the keel (KG 5.0m).

She is to load a 100 tonnes heavy lift on the port side of her main deck.
The center of gravity of the heavy lift will finish 10 metres above the keel (Kg 10m).

a) Calculate the new height of the ship's centre of gravity (KG_1) after loading.
b) Will there be any other shift to be considered? (5 marks)

19. You are officer at the watch at night (0200) sailing near a coastline.
You see a red flare towards the cost.
What actions should you take? State why. (3 marks)

20. m.s. "Alpha" is loading in a tropical load line zone port for a port in a summer zone. The total distance between the ports is 6424 NM.

After 2304 NM the ship will sail into the summer zone in which the port of destination is situated.
Immediately before entering the port of destination the ship has to pass under a bridge, the lowest point of which is 31.1 meters above the water surface (there is no tide).

In order to ensure safe navigation a clearence of 50 cms is desired when passing under the bridge.
During the voyage a maximum of 200 tonnes of sea water can be taken in as ballast.

You are asked to proceed at a speed of 12 knots and at that speed the daily consumption of fuel and fresh water is a total of 15 metric tonnes (no fresh water is produced on board).

(a) At what draught will you leave the loading port?

(b) Will you need to take in ballast? If "yes" - how much and when?

m.s. "Alpha" particulars :-

When loaded to the summer load line the highest point of the ship - the masthead - is 30.4 meters above the water surface.
Mean max draught in a tropical zone is 8.24 m.
Mean max draught in a summer zone is 8.07 m.

continued next page

m.s. "Alpha" particulars ntinued :-

For each 30 metric tonnes loaded or discharged the ships draught will be changed by 1 cm.

NOTE: m.s. "Alpha" must comply with the load line regulations at all times.

(15 marks)

21. You are officer at the watch at night.
Which of the following actions can you NOT take without consulting the Captain?

a) Alter course to PORT to avoid a collision.
b) Alter course due to navigational requirements.
c) Sound the fire (or general emergency) alarm - assuming that there is a fire.
d) Order the Radio Officer to send out a SECURITAY message.
e) Order the Radio Officer to send out an SOS distress signal because you see another ship hit by an exocet missile - and obviously the ship hit is incapable of sending out its own distress signal.
f) Use the engine room telegraph so as to reduce speed for anti-collision purposes.
h) Alter course to stop synchronous rolling.
i) Order the crew to secure an unpacked car which is badly lashed on the upper deck.
j) Place the engines on stand-by when visibility is becoming restricted. (8 marks)

22. When considering the use of VHF, what type of messages do the following words come before :-

a) MAYDAY
b) PAN
c) SECURITAY (4 marks)

23. Answer EITHER (a) OR (b)

(a) You are in charge of loading a 50 ton heavy lift using the ship's own heavy lift derrick, SWL 50 tonnes. The lift is to be placed on deck.

Explain briefly the points you must consider and the difficulties you must anticipate.

(b) A tanker is on passage loaded with crude oil. Soundings discover that No. 4 port wing tank (Which is a segregated ballast tank) is slowly filling with water.

The Engineers deny that any valve is open and finally break the ballast line to prove that they are correct.

The tank continues to fill slowly.

What action would you take? Clearly indicate any safety precautions you would consider necessary.

(10 marks)

NATIONAL MARITIME POLYTECHNIC

Exam for prospective lecturers - ENGINE

Instructions to Candidates:

1. Do NOT turn over this page until told to do so.

2. Do NOT write on the question paper.

3. Do NOT use calculators, slide rules, mathematical tables or other similar aids.

4. Show ALL computations of each question.

5. Diagrams may be drawn in pencil, ALL other work must be done in ballpoint or inks.

6. Answer ALL questions.

7. Time allowed: TWO hours.

8. Marks for each correct solution are shown on the question paper.

1. Add $3.4\,a + 1\ 3/4\,b - 7.8\,c$
$2.8\,a - 4.3\,b - 8.7\,c$ (2 marks)

2. Subtract $6.0\,a + 902\,b + 9\,c - 6.3\,d$
from $-5.3\,a + 37\,b + 9.9\,c - 6.3\,d$ (2 marks)

3. Multiply 627×39 (2 marks)

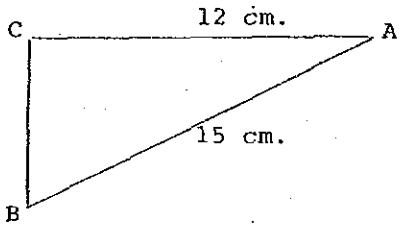
4. Multiply $(3a - b) \times (2a + 6b)$ (2 marks)

5. Divide $144 \div 1.2$ (2 marks)

6. Write $2\ 3/8$ as a decimal. (2 marks)

7. Add 96 Watt + 1.396 KWatt + 2 Hp (2 marks)
Give your answer in Hp.

8. Solve for x: $\frac{2 - 3x}{3} + x = 34 - \frac{4x - 3}{6}$ (2 marks)

9. 

From the triangle ABC where C is 90°

Determine : Sin B
Cos B
Tan B (3 marks)

10. A boat can travel at 6 km/h in still water.
A man sails 3 km upstream a river in the boat, then immedeately sails back downstream to his starting point.
If the total time taken is 1 hour and 6 minutes, determine the current in the river. (5 marks)

11. In a bar a group of seamen orders five beers and six whiskies
At another table the ships agent orders 27 beers but has coupons for two free whiskies which are therefore deducted his bill.
The check for the group of seamen is 177 Pesos.
The check for the ships agent is 199 Pesos.
What is the prices of (a) a beer (b) a whisky in this bar ?
(5 marks)

12. A rectangular pool of 10 meter x 4 meter has fresh water in it to a depth of 2.2 meters. (The depth of the pool is constant)
a) Calculate the new water depth if a solid cylinder with flat ends is lowered into the pool. Cylinder dimensions being, radius 1 meter and length 1.4 meter. Relative density of the cylinder is 8.275. (Take $\pi = 22/7$)
b) Calculate the new water depth if a boat weighing 2200 kg. is floated in the pool.
Note : a) and b) are different problems. Do not calculate the depth of water if both cylinder and boat are in the pool together.
(7 marks)

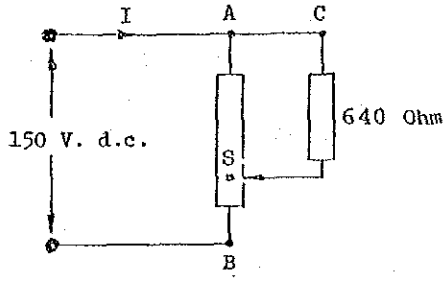
13. A line is drawn from an external point A and passing through the centrepoint O of a circle cuts the circumference at a diametrically opposite points B and C. Further D and E are points of contact of two tangents drawn to the circle from A.

Given AO = 10 cm and AD = 8 cm, calculate:

a) Diameter of the circle.

b) The ratio of the length of the parts into which BC is divided by the cord DE. (Points D and E are joint by a straight line) (10 marks)

14. A slide wire resistor AB, as shown in the figure, is used as a potential divider across a 150 V d.c. supply and takes a current I of 0.4 A. Between A and the slider ends S a resistor ACS of 640 Ohm is connected. The position of the slider is so ajusted that the power dissipated in branch ACS is 40 Watt.



Determine the magnitude of resistor AS. (10 marks)

15. Two motors, A and B, are supplied with current from a 120 V, 50 Hz. main source. Motor A takes 1440 Watt and 0.8 power factor lagging and Motor B takes 0.54 KWatt and a current of 6 A.

Calculate the following:

a) The current for Motor A.
b) The power factor for Motor B.
c) The phasor diagram for both Motors. (10 marks)

16. Draw (sketch) an indicator diagram of a 4-stroke Diesel engine and explain:

a) The various points on the diagram.
b) How is horsepower determined by the indicator diagram. (8 marks)

17. What preparations do you find necessary before attempting to start a main Diesel engine after replacing one piston. (6 marks)

18. Describe (sketch) the basic refrigerating circuit for a compressor type industrial plant showing the necessary components and give a short explanation of their functions.

Show the refrigerants circuit in a T - S diagram and relate with numbers the various points in the diagram to the above refrigerating system. (10 marks)

19. Compare the characteristics of centrifugal pumps with those of rotary positive displacement pumps.

Suggest with reasons the type of pump most suited for each of the following duties:

a) Main sea water circulation.
b) Crude oil cargo discharge.
c) Toxic chemical cargo discharge. (10 marks)

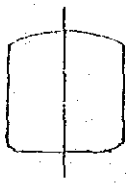
NATIONAL MARITIME POLYTECHNIC

Exam for prospective lecturers

Instructions to Candidates :-

1. Do NOT turn over this page until told to.
2. Do NOT write on the question paper.
3. Do NOT use calculators, slide rules, mathematical tables or any other similar aids.
4. Show ALL working and the question to which it relates.
5 Diagrams may be drawn in pencil, ALL other work must be done in ballpoint or ink.
6. Attempt ALL questions.
7. Time allowed : TWO hours.
8. Marks for each correct solution are shown on the question paper.

14. Draw a simple sketch, in pencil or ballpoint, such as is shown and on it clearly show the relative positions of G, B, and M assuming the ship to be stable.



(2 marks)

15. You are on a known position of good accuracy. The true bearing of a lighthouse is 135°. The bearing by magnetic compass of the same lighthouse is 130°, the magnetic variation is +6°.
You are steering 100° by the magnetic compass.
What is the deviation of the compass and what is the true heading? (5 marks)

16. You are Officer of the Watch and see a man fall overside from the port side forward. What are your immediate actions ?

(5 marks)

17 You have established your position by cross-bearings using two lighthouses the two bearings were 45° true and 210° true.
15 minutes later you are establishing your position again this time by two lighthouses bearing 48° true and 315° true.
The distances to all the lighthouses mentioned are between 6 and 7 NM.
A closer look at the two positions gives you reasons to believe that at least one of them is very inaccurate.
Which of the two positions the first one or the last one is most likely to be inaccurate? Why?

(4 marks)

18. On a certain day you have only one celestial observation and no other observations at all neither celestial nor terrestrial.
The one you had was from a celestial body right ahead.
Can you establish the ships position by that sight?
If "yes" how?
If "no" can the sight then give you any sort of usefull information?
Which information?

(4 marks)

19. The M/S "Delta" is loading in a tropical load line zone port for a port in the summer zone. The total distance between the ports is 6424 NM.

After steaming 4608 NM she will sail into the summer load line zone.

Immediately after leaving the loading port the ship has to pass under a bridge, the lowest part of which is 30.75 meters above the water surface - there is no tide.

In order to ensure safe navigation a clearance of 50 cm is desired when passing under the bridge.

During the voyage a max of 300 tons of sea water can be taken in as ballast.

At what draught should the ship leave the loading port?

Will it be necessary to take in ballast? If "yes" - how much and when?

What is the draught two days after sailing?

The following information is given regarding the M/S "Delta" :-

When loaded to the summer load line the highest point of the ship - the masthead - is 30.4 meters above the water line.

Maximum mean draught in the tropical zone is 8.24 m.
Maximum mean draught in the summer zone is 8.07 m.

19 (cont.) For each 30 metric tonnes loaded or discharged, the ship's draught will be changed by 1 cm.

The total daily consumption of fuel and fresh water is 15 metric tonnes (no fresh water is produced on board).

(20 marks)

20. A general cargo ship is to load the following cargoes :-

a) Three heavy lifts

b) Silver

c) Whisky

d) Mail

e) Tea in boxes

f) Coffee in sacks

g) Steel coils

h) Television sets

i) Drums of petrol

j) Butter

k) Palm oil in bulk

l) 500t of bulk grain

Assuming three ports of discharge, write BRIEF NOTES on what major problems will have to be considered when preparing the stowage plan.

Divide your answer into two sections :-

(i) General comments which apply to any stowage plan.

(ii) Specific points as they relate to the cargoes named above.

(20 marks)

SELECTION PANEL INTERVIEW PROCEDURE

1. INTERVIEWEE CALLED IN

2. INTERVIEW PANEL MEMBERS INTRODUCED TO CANDIDATE (BY CHAIRMAN)

3. LATEST INFORMATION ABOUT POSITION APPLIED FOR:

    a. Purpose (Professor)
    b. Where (Tacloban)
    c. Employment Dates (1 June)
    d. Number of candidates for final interview
    e. Negotiations NMP/JICA next week

4. INTERVIEW PROCEDURE INTRODUCED TO CANDIDATE

    a. Questions from panel
    b. Asked to teach
    c. Hand-over of original documents + copies for verification

5. CANDIDATE HAND-OVER DOCUMENTS/COPY (Secretary)

    a. Check Sufficient Number of Documents
    b. Verification of original/copy

6. QUESTIONS FROM PANEL BASED ON:

    a. Application form
    b. Test
    c. Preliminary interview

7. CANDIDATE ASKED TO PREPARE HIMSELF TO TEACH SUBJECT (Own choice or panel suggested)

    a. Ten minutes preparation (paper + pencil)
    b. Five minutes teaching

8. DURING THE 10 MINUTES PREPARATION TIME, INTERVIEW PANEL GOES THROUGH DOCUMENTS

9. CANDIDATE TEACHES SUBJECT FOR FIVE MINUTES

10. INTERVIEW PANEL ASK QUESTION RELATED TO:

    a. Taught subject
    b. Any other matters

11. CANDIDATE ALLOWED TO ASK QUESTIONS TO INTERVIEW PANEL

12. INTERVIEW PANEL INFORM CANDIDATE ABOUT:

    a. Date for decision
    b. Receive official letter
    c. Can call in by telephone to know result next Monday June 3 (Ask for CAPT. SUBIJANO)

13. CANDIDATE RECEIVES ORIGINAL DOCUMENTS

14. CANDIDATE ASKED TO LEAVE THE ROOM

（3） A 4フォーム（機材供与要望リスト）：

Form A 4.
(1962 *Revision*)

THE COLOMBO PLAN
COUNCIL FOR TECHNICAL CO-OPERATION IN SOUTH AND SOUTH-EAST ASIA
Equipment for Traning or Research Institutes and for Equipment accompanying Experts

APPLICATION

By the Government of The Philippines

from The Government of Japan
(Country)

Note.—(a) This Form has been devised for the general guidance of co-operating countries in order to facilitate the supply of relevant information and data necessary to afford an adequate appreciation of the nature of the technical co-operation required. The careful completion of this application form will avoid much subsequent back and head to speedier action. Separate forms A4 should be used for requests for equipment for each individual institute or project.

(b) The requisite number of copies of the Form A4, including a copy for the Colombo Plan Bureau, duly endorsed by the appropriate Foreign Aid Department of the requesting government should be forwarded to the donor government concerned through the appropriate channels.

1. Background information Please describe as concisely as possible the general outlines of the project for which the equipment is required, indicating whether the latter is (a) for use by an expert in the performance of his duties (b) for a training scheme or institution or (c) for a research institution. If either (b) or (c) please say whether the equipment is for the establishment of a new institution or the expansion or re-organisation of an existing one (e.g., by the provision of a new department, &c.). The name and exact location of the institution, its approximate cost and the authority responsible for it should be stated. Where appropriate details should be given of the availability of any services required for the operation of the equipment. This would include operation by electricity (i.e. type of current, periodicity, voltage and any variations, phases, frequency etc. and if D.C. is the only current available please give full details), water reticulation or steam gas etc. Details of similar equipment already in use should be given.	The National Maritime Polytechnic (NMP) has been set up to upgrade Filipino seafarers especially in respect to the 1978 STCW IMO Convention-which relates to the continued evolution and progression of merchant marine technologies and the necessary qualifications associated therewith. NMP has been reciplent of grant aid financed by the Japanese Government through JICA. An extensive system of modern training equipment is to be fitted into new purpose built training facilities. The equipment is required for both the use of JICA experts and for training at the National Maritime Polytechnic. Location: Brgy1 Cabalawan, Tacloban City, Leyte,Philippines Approx. Cost, Building and Land (excl. expansion): ¥250 million Authority: Ministry of Labor and Employment Electricity Supplies: 3 phase 220V 60Hz 1 phase 220V 60Hz Deep well water system
2. Description of equipment required. Please give a full description of each item and general specifications where possible. The manufacturer and estimated cost of each item if known together with details of the proposed end use of item should be given. Where applicable, give details of any special packing or tropic proofing required and indicate whether handbooks or instruction data supplied in English will suffice. If appropriate, please indicate any required priorities or phasing of deliveries and advise whether adequate facilities exist for maintenance and servicing of the type of equipment requested. (If lengthy, detailed lists should be annexed; it would be convenient to have separate annexures for (a) films; (b) books and (c) other equipment.)	See attached Annexures
3. Has this equipment request already been directed to any other Agency or Colombo Plan country and if so to whom was it addressed and with what result	No
4. Has the list of equipment already been discussed with representatives of the supplying country/ies? If so, please indicate what stage the discussions have reached	The supply of equipment has been agreed - see "Records of Discussions Between Japanese Implementation Survey Team" dated 13th June 1985. However, the list of equipment has not yet been discussed with Japanese Government representatives.
5. Furnish full particulars in respect of— (a) Consignee; (b) Official to receive documents and enquiries; and (c) Clearing agent at port of entry.	(a) Tacloban Project, Tacloban, Philippines (b) A.V. Oca - NMP-JICA Project Coordinator (c) Phil-Japan Shipping Corporation, Delgado Bldg., Port Area, Manila
6. Where equipment is required for use by an expert Please indicate— (a) The country or agency from which the expert has been requested or obtained (b) His duties and length of secondment (a reference to the relative Form A. 1 will suffice when the expert is being provided by the country to whom the equip-	(a) Japan (JICA) (b) To directly train local instructors and indirectly upgrade Filipino seafarers. 4 years (from 13 June 1985).

(c) What use is proposed for the equipment when the expert's period of secondment terminates?	(c) The same purpose - upgrading of Filipino seafarers.
(d) By what date is the equipment required?	(d) Priority Equipment by Jan. 1986. Other equipment as the secondment progresses but preferably by Jan. 1987.
7. Where equipment is required for Training or Research Institutions Please indicate—	
(a) Nature and standard of training or research to be undertaken	(a) Upgrading of Filipino seafarers to STCW 1978 levels.
(b) Total number of students to be accommodated from within the country or from elsewhere in the Region, the qualifications for admission, the duration of courses, and the annual output of trainees	(b) All students to be Filipino. 1986 enrollment - 1,802 1987 enrollment - 3,604 The 14 different courses have varying entry qualifications from Merchant Navy experience as Senior Rating to Master - lengths of courses from 1 week to 15 weeks.
(c) Whether there is already a similar institute(s) in existence in the country. If so, please give details.	(c) None
(d) Whether buildings are already available. If not has construction started and when is it expected to be completed?	(d) Under construction. Completion date AFTER equipment installation 31 March 1986.
(e) Whether qualified staff to handle the equipment has been recruited or is proposed to be recruited locally. If not is it proposed:— (i) to recruit foreigners under aid-programmes? (ii) to train locally recruited personnel abroad in handling equipment? (the reference numbers of any Forms A.1 or A.2 relating to such requests should be quoted)	(e) Some qualified staff already employed. Further local recruitment being undertaken. Additionally it is planned to train locally recruited personnel in Japan. (No proposal to request foreigners under aid-programmes for Tacloban).
(f) Taking into account the answers to (d) and (e) above, what is the date by which the equipment is required and the date on which training or research work is to commence	(f) Equipment required for use of Japanese experts who arrive in December 1985 (say delivery Jan. 1986) Training will commence in June 1986 but will have staggered start (some courses not starting until Dec. 1986)
(g) Whether any assistance in drawing up the Scheme has been obtained from outside experts? (Any specialist reports or Government surveys (e.g., Educational Committee Reports, &c.), bearing on the request should be provided if possible)	(g) None
8. Correspondence Name, Postal and Telegraphic Address of official to whom correspondence regarding this application is to be forwarded	The President National Maritime Polytechnic Suite 503, Dona F. Syjuco Bldg. Remedios cor. Taft Avenue, Malate, Manila, Philippines Telex 41181 MARTEK PM Attention: Abelardo V. Oca NMP-JICA Project Coordinator

Signed: BLAS F. OPLE
Chairman, NMP Board of Trustees
on behalf of the Government of the Philippines

Date: 31st July 1985

For use only by Donor Government

Application accepted/rejected/withdrawn

on behalf of the Department of ...

Date:

Annexure (c) (1)

ADDITIONAL EQUIPMENT FOR THE MODERNIZATION OF THE NATIONAL MARITIME POLYTECHNIC TRAINING CENTER PROJECT

LIST OF EQUIPMENT COMMON OR FOR USE OF DECK AND ENGINE DEPARTMENTS:

8	Units	Over head projector two bulb type complete with accessories, attachments, spaces and materials including screen and transparencies, frames and spare bulbs. HIGH PRIORITY.
1	Unit	Copier capable of producing OHP transparencies from books/magazines.
4	Units	Slide projector and carousels, automatic, capable of slide/tape interface, complete with accessories, spares, materials, spare carousels.
1	Unit	Rescue boat, semi-rigid, complete with outboard motor capable of at least 12 knots, oars, life jackets and other necessary items.
	Units	Bus/mini or coaster (aircon)
15	Sets	Office equipment and furniture for 15 NMP faculty members.
12	Units	VTR VHS with monitors (26"), VTR Camera, tape editing unit, tapes and other necessary items including booster system to allow all monitors to be played simultaneously.
2	Units	Betamax (as VHS above)
1	Set	Photo laboratory fully equipped with developing and enlarging for color and black and white, tables, trays, developers, spares, film, print paper etc.
2	Units	Movie Projector 16 MM complete with accessories, permanent screens, sound, spares. Priority-one unit per floor per wing.
2	Units	Cassette tape recorder complete with two external speakers, interface and leads for use with slide projectors and spare blank tapes.
1	Unit	Cassette tape editing unit
1	Unit	Word-processor. AP 500 or similar

CONFERENCE ROOM EQUIPMENT

1	Ea	Long table (seating capacity-20) with chairs

ASSORTED ATHLETIC AND SOCIAL EQUIPMENT

1	Unit	Camera, 35 mm. auto focus, complete with flash, light meter and stand for production of slides from diagrams.

5	Units	Air hygrometer for each room with electronic equipment for determining relative humidity.
		Audio-visual aid materials.

Annexure (c) (2)

LIST OF ADDITIONAL EQUIPMENT FOR DECK DEPARTMENT

1	Unit	Language Laboratory equipment, complete for teaching Nipongo, Marine English, radio telephony, radiotelegraphy, etc. for trainees.
		Chart room equipment complete with drafting machine, parallel rulers, dividers, chart tables, nautical triangles for 30 trainees and associate equipment including charts.
		Erasers, compasses, (large) parallel rulers (large), protractor (large). For whiteboard use.

WHITE BOARD/CHALK BOARDS/CINEMA SCREENS

1	Unit	Whiteboard metallic, fixed small
5	Units	Whiteboard metallic, fixed large.
1		Safe, fire proof, large
2		Filing cabinet, high security, fire proof.
		Chinagraph, pencils for use in radar simulator supply for 32 trainees per month for 4 years.
4	Sets	Drawing board with T squares and scale
10	Sets	Drawing instruments
10	Sets	French curves and various technical drawing templates.
5	Units	Loud speakers (handy tape)

ASSORTED SEAMANSHIP EQUIPMENT FOR 20 TRAINEES

ASSORTED GENERAL MAINTENANCE EQUIPMENT AND TOOLS

LIST OF EQUIPMENT FOR USE OF THE JAPANESE EXPERTS:

7	Sets	Office equipment and furniture
		Office equipment and furniture for the secretaries of the experts and coordinator.

Annexure (c) (3)

ADDITIONAL EQUIPMENT FOR ENGINE DEPARTMENT

MACHINE SHOP - - - - - - EQUIPMENT

2	Ea	Lathes, sizes about 1500 x 200 mm, el-motor-driven, with standard accessories.
2	Sets	Cutting tools for the above lathes.
2	Ea	Drilling machines, (Drill press) capable of accomodating drill sizes of up to 20 mm size, complete with standard accessories.
3	Ea	Drilling machine, portable (hand-held), pneumatic, with standard accessories, capable of accomodating drill bit sizes up to 12 mm.
2	Ea	Drill bits, sizes up to 12 mm.
2	Ea	Grinding machine, el-driven, 2 grinding wheels each of about 200 mm. diameter, for grinding high-speed tool steels.
1	Ea	Dressing tool, diamond, for dressing the above grinding wheels.
1	Ea	Milling machine, about 150 mm. run, with standard accessories and tools.
2	Sets	Welding equipment, oxy-acetylene, each with a set of various torch sizes, oxygen and acetylene banks, hoses and standard accessories.
2	Sets	Welding equipment, electric arc, with standard accessories.
		Associated tools and measuring instruments found in a shipboard machine shop.

ANALYZERS

3	Ea	Analyzers, exhaust gas (ORSAT).
3	Ea	Analyzers, boiler water
1	Ea	Analyzer, fuel oil.
1	Ea	Analyzer, lubricating oil.
1	Ea	Diesel engine-driven generator, could be second-hand, with the following specifications: Engine: No. of cylinder-from 3 to 6, at least 750 kw(1000HP), medium speed, preferably marine type, with complete accessories to enable trainees to conduct heat balance calculations, and practice disassembly-assembly of engine with suitable generator.
1	Ea	Second-hand boiler, oil fixed, automatic, complete with instruments, superheater and steam turbine and necessary associated equipment.

Annexure (c) (4)

Toolkit for Electronic Maintenance including associated test equipment e.g. Dual trace oscilloscope, frequency counter, digital synchronizer, power meter, signal generator, multimeter, filter and other necessary associated tools, meters and equipment.

Form A4'
(revised in Nov. 1981)

TECHNICAL COOPERATION
BY THE GOVERNMENT OF JAPAN
PROPOSAL (BOOKS)

By the Government of ...the Philippines... to the Government of Japan

for the supply of books

Notes.- (1) This form has been devised for the general guidance of co-operating countries in order to facilitate the supply of relevant information and data necessary to afford an adequate appreciation of the nature of the technical assistance required. The careful completion of this proposal form will avoid much reference back and lead to speedier action.

(2) The requisite number of copies of the Form A4' duly endorsed by the appropriate Foreign Aid Department of the requesting government should be forwarded to the donor government concerned through the appropriate channels.

(3) The books to be supplied by the Government of Japan will become the property of the requesting government upon receipt of the shipping documents through the Japanese Embassy. Since the books are supplied on C.I.F. basis, it is requested that the recipient government will meet:
(a) customs duties, internal taxes and other similar charges, if any, imposed in respect of the books, and
(b) expenses necessary for the transportation of the books.

1. Name and Address of institution Please describe the name and location of the institution for which the books are required.	National Maritime Polytechnic Suite 503, Doña Felisa Syjuco Bldg. Remedios cor. Taft Avenue Malate, Manila Philippines
2. Description of books required Please indicate name, publisher and unit of books. (If lengthy, lists should be annexed.)	See attached Annexure
3. Furnish full particulars in respect of- (a) Consignee; (b) Official to receive documents and enquiries; and (c) Clearing agent at port of entry.	(a) Tacloban Project, Tacloban, Philippines (b) A.V. Oca - NMP-JICA Project Coordinator (c) Phil-Japan Shipping Corporation, Delgado Bldg.Port Area Manila

for BLAS F. OPLE
Signed Chairman, NMP Board Of Trustees

on behalf of the Government of ...the Philippines...

Date : ....31st of July 1985.....

For use only by Donor Government

Application accepted/rejected/withdrawn

Date : .....

Annexure (b) (1)

REFERENCE BOOK LIST - DECK

SEAMANSHIP

Danton G. — Theory and Practice of Seamanship. 8th Edition. Routledge and Kegal Paul, London (39 Store Street, London WC1E 7DD) 1980 ISBN 0 7100 0502 4

Wright C.H. — The Efficient Deck Hand 3rd Edition. James Laver Printing Co Ltd., (Argyle Street, Liverpool 11 5BL) 1975 ISBN 0 904825 05 1

Wright C.H. — Survival At Sea. James Lever as above

Admiralty Manual of Seamanship Vol I, II, III. HMSO (Her Majesties Stationery Office, can be obtained from 49 High Holburn, London WC1V 6 HB)

Nicholl's — Seamanship and Nautical Knowledge, 25th Edition. Brown Son and Ferguson

McLeod W. — The Boatswain's Manual 4th Edition. Brown, Son and Ferguson, 1977. ISBN 0 85174 309 9

Knight — Modern Seamanship

Hooyer H.H. — Behaviour and Handling of Ships. Cornell Maritime Press, (Centreville, Maryland 21617)

The Mariners Handbook 5th Edition NP 100 with Supplements. Hydrographer of the Navy 1979 (Available from Admiralty Chart Agents)

Maritime Buoyage System A — IALA

Code of Safe Working Practice for Merchant Seaman DOT. 1984 ISBN 0 11 550658 6

Lorne & Maclean — Ship's Fire Fighting Manual

Lee E.C. & K. — Safety and Survival at Sea, Norton, 1980 Edition

Mankabady S. — Collision at Sea: Guide to the Legal Consequences. North Holland Publishing Co 1978 (Elsevier/North Holland Inc., 52 Vanderbilt Ave., New York, N.Y. 10017) ISBN 0 444 85155 0

A Seaman's Guide to the Rule of the Road 1972 Pub: 1981
ESL Bristol, Waverly Road, Yate, Bristol BS17 5RB

Plummer C.J. Shiphandling In Narrow Channels 3rd Edition
Cornell Maritime Press ISBN 0 87033 247 3

Munro Seamanship Primer 14th Edition G.E. Earl N Peter
James Munro & Co Ltd., Kilmarnock KA3 6DQ

Lavery H.J. Shipboard Operations
William Heinemann Ltd., 10 Upper Grosvenor St
London W1X 9PA

NAVIGATION

Admiralty Manual of Navigation HMSO (as above)
Vol 1 (1977) 0 11 770768 6
Vol 2 (1982) 0 11 771467 4

Gardner A.C. & Creelman W.G. Navigation for School and College
Brown, Son & Ferguson

Bowditch American Practical Navigator
Defense Mapping Agency Hydrographic Center
Vol 1 (1977) DMA Stock No NVPUB9V1
Vol 2 (1976)

Cotter C.H. The Elements of Navigation and Nautical Astronomy
Brown, Son & Ferguson Latest Edit (1977?)
ISBN 0 85174 270 X

Moore D.A. Basic Principles of Marine Navigation
Kandy Publications - see below

Dutton's Navigation and Piloting 13th Edition 1977
by Elbert S. Maloney Naval Institute Press
(Annapolis, Maryland) ISBN 0 87021 164 1

Nories Nautical Tables by A.G. Blance 1983
Imray Laurie Norie and Wilson Ltd., Saint Ives,
Cambridgeshire, England ISBN 0 85288 091 X

Nautical Almanac 1986 HMSO (as above)

Brown's Nautical Almanac 1986 Brown, Son and Ferguson Ltd.,
4 - 10 Darnley Street, Glasgow G41 2SD, Scotland

Malacca/Singapore Straits - Guide to Planned Passages for Draught Restricted Ships (from Witherby & Co., 32-36 Aylesbury St., London EC1R 0ET

Frost A. — Principles of Navigation
Brown Son & Ferguson

Nicholls Concise Guide to the Navigation Examinations revised by E.J. Coolen Vol 1 (1980) 0 85174 130 4
Vol 2 (1984) 11th Edition 0 85174 480 X

CHARTWORK

Squair W.H. — Modern Chartwork 1971 (? latest Edition)
Brown, Son and Ferguson

Moore D.A. — Marine Chartwork and Navigational Aids
Kandy Publications

Marine Observers Handbook HMSO 10th Edition 1977

Burgess C.R. — Meteorology for Seamen 1982
Brown, Son & Ferguson

Roberts C.W. — Maritime Meteorology - a Guide for Deck Officers
London, Reed Publications, (36/37 Cock Lane
London EC1A 9BY) 1984

RADAR AND ELECTRONIC NAVIGATIONAL AIDS

Smith & Mulroney — Parallel Indexing Techniques
Burger W. — Radar Observers Handbook
Brown Son & Ferguson

Sonnenberg G.J. — Radar and Electronic Navigation 5th Edition
Butterworths 1982

Appleyard S.F. — Marine Electronic Navigation
Routledge and Kegan Paul, London
ISBN 0 7100 0533 4

COMMERCE AND MARINE LAW

Wilford M. et al — Time Charters Lloyd's of London Press
ISBN 0 904093 49 2

Hudson N.G. — Marine Claims Handbook

Hopkins F.N. — Business and Law for the Shipmaster
Brown, Son and Ferguson 6th Edition 1982
ISBN 0 904093 49 2

Hopkins F.N. Peril at Sea and Salvage: a Guide for Masters

Kovats L. The Law of Tugs and Towage

Mankabady S. Hamburg Rules on Carriage of Goods by Sea
ISBN 90 286 09881

Buglass L.J. Marine Insurance and General Average in USA

Brown R.H. Marine Insurance Vol 1 Principles
2 Cargo Practice
3 Hull Practice

Britin B.H. International Law for Seagoing Officers

Holman's Handy Book for Shipowners and Masters
West of England Shipowners Mutual Insurance Ass.
(London) Ltd., 1 Pepys St., London EC3N 4AL

British Shipping Law Series

Carver's Carriage By Sea
CIF and FOB Contracts
Forms and Precedents
Law of General Average and Y-Antwerp Rules
Int. Conventions of Merchant Shipping
Temperley's Merchant Shipping Acts
Singh: Shipowners
Maritime Liens

Pielow C Guide to Port Entry (Latest) Shipping Guides

Fair M.L. Port Administration in the United States 1954
Cornell Maritime Press

Law, Force and Diplomacy at Sea
London, Allen and Unwin 1985

Holdert H.M.C.
Buzek F.J. Collision Cases Lloyd's of London Press, Colchester
1984

Branch A.E. Dictionary of Commercial Terms and Abbreviations
London, Witherby and Co 1984

Scrutton on Charterparties and Bills of Lading 19th Edition
by A.A. Movstta, M.J. Mustill and S.C. Boyd.
London, Sweet and Maxwell, 11 New Fetter Lane 1984

Lloyd's Nautical Year Book 1986 Lloyd's of London Press Ltd.,
Sheepen Place, Colchester, Essex CO3 3LP

Cuffley C.F.H. — Ocean Freights and Chartering
Granada Publishing Ltd., Frogmore, St Albans, Herts AL2 2NF 1980 (or later) ISBN 0 246 11383 9

TANKERS, LNG, LPG, CHEMICAL TANKERS ETC.

Grey M. — Chemical/Parcel Tankers; their cargoes, design and markets. 3rd Edition. London, Fairplay Publications (52-54 Southwark St. SE1 1UT) 1984

Baptist C. — Tanker Handbook for Deck Officers 6th Edition
Brown Son and Ferguson 1980
ISBN 0 85174 386 2

Marton G.S. — Tanker Operation 1st Edition
Cornell Maritime Press 1981
ISBN 0 87033 240 6

Rutherford D. — Tanker Cargo Handling 1980
Charles Griffin & Co Ltd., Crendon St. High Wycombe, Bucks HP 13 6 LE

Wooler R.G. — Maritime Transportation of LNG
Cornell Maritime Press 1975
ISBN 0 87033 193 0

Woolcott T.W.V. — Liquefied Petroleum Gas Tanker Practice
Brown Son & Ferguson 1977 (?)
ISBN 0 85174 295 5

Huges J.R. — Storage and Handling of Petroleum Liquids (abridged 1978 reprint of 1970 edition)

Kenworthy L. (Ed.) — Chemicals in Ships (fire fighting chemicals, tank cleaning chemicals and safety precautions). Institute of Marine Engineers 1978
Published: Marine Management Holdings, 76 Mark Lane, London EC3R 7 JN ISBN 0 900976 721 X

Berry M. — Inert Gas Systems and Tank Cleaning. Interlink. Intergas.

Corkhill M. — Product Tankers and their market role. Fairplay

IMO PUBLICATIONS

Code for Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk. Including Supplements

Code for Construction and Equipment of Ships Carrying Liquefied Gases in Bulk. Including Supplements

Code of Safe Practice for Ships Carrying Timber Deck Cargoes

Crude Oil Washing Systems

Inert Gas Systems for Oil Tankers

Grain Rules

International Maritime Dangerous Goods Code 1978 Edition Including ammendments to all four volumes

Code of Safe Practice for Bulk Cargoes Including supplements

Solid Bulk Cargoes

Ship's Routeing 5th Edition Incorporating ammendments 1-5. London, IMO Sales No. 927 84.03

N.B. All IMO publications should be available from IMO, 4 Albert Embarkment, London SE1 7SR. All are required in ENGLISH medium.

MISCELLANEOUS

Taylor D.A. — Merchant Ship Construction
Butterworths 1984 London

Levison H. — Astro-Navigation by Calculator.
Newton-Abbott, David and Charles 1984

Rawson K.J.
Tupper E.C. — Basic Ship Theory Vol 1 0 582 44523 X
Vol 2 0 582 445248 3rd Edition
Harlow, Longman Group Ltd., Longman House, Burnt Mill, Harlow, Essex CM20 2 JE.

International Conference on Simulators, Proceedings. Held Sussex, 1983. Organized by Computing and Control Division of Institute of Electrical Engineers in association with Ergonomics Soc. London. IEEE 1983 Conference Publication No 226

Ship Captains Medical Guide 21st Edition 1983 HMSO

Grant G.A.A.
and
Klinkert J. — The Ship's Compass 2nd Edition
Routledge Kegan Paul. (London)
ISBN 0 7100 6522 1

Taylor L.G. — Cargo Work 10th Edition 1981
Brown Son and Ferguson
ISBN 0 85174 408 7

Thomas B.E.M. — Management of Shipboard Maintenance
Stanford Maritime, London ISBN 0 540 07354 7

Derrett D.R. — Ship Stability for Masters and Mates
Fifth Impression 1979 (or later)
Stanford Maritime Ltd. (12-14) Long Acre,
London WC2E 9 LP)
ISBN 0 540 01403 6

Thomas O.O — Stowage; Properties and Stowage of Cargoes
1981 ISBN 0 85174 000 6
Brown Son and Ferguson

Reed's Engineering Knowledge for Deck Officers W. Embleton
T.D. Morton 1973 (or later)
Thomas Reed & Co. Ltd., Sunderland.

Cockcroft — Guide to the Collision Avoidance Rules

Taylor and Conway — Cargo Work: Care, Handling and Carriage of Cargoes. 10th Edition Brown, Son and Ferguson 1981

Amend 5748 — Final Act of International Conference on Marine Pollution from Ships 1973 and Protocol. Intervention on the High Seas in Cases of Marine Pollution by Subtances other than Oil 1973 HMSO

INTERNATIONAL CHAMBER OF SHIPPING

Guidelines for Tankwashing with Crude Oil

Clean Seas Guide for Oil Tankers (Load on Top)

International Safety Guide for Oil Tankers and Terminals (combines Tankers Safety Guide-Petroleum- and Int. Oil Tanker and Terminal (Safety Guide) Witherby and Co.
Newest Edition 1983 (?) NOT 1979 SBN 0 900886 36 6

Tanker Safety Guide-Chemicals

Tanker Safety Guide (Liquefied Gas)

Safety in Oil Tankers

Safety In Chemical Tankers

Bridge Procedures Guide

KANDY PUBLICATIONS

The whole series (about eight books each costing about £2.50) of Kemp and Young Publications for Deck Students;

e.g. Compass Work 1972 Edit or later SBN 85309 046 7
Ship Construction Notes
Ship Stability
Seamanship Notes
Meteorology Notes
Business Notes
Cargo Work

Publisher: Stamford Maritime Ltd., 12 Long Acre, London WC2E 9 LP

Sight Reduction Tables H.O. 249 US Coast Guard

Sight Reduction Tables H.O. 229 US Coast Guard

Chart Symbols Chart 5011 British Admiralty
List of Lights - British Admiralty
Radio Vol II - Radio Beacons

Reeds Distance Tables

Ocean Current + Tide Atlas

Ocean Passages of the World

ECONOMICS AND MANAGEMENT

Laurence C.A.	Vessel Operating Economies Fairplay Publications, 52/54 Southwark St., London SE1 1UT
Downward J.M.	Running Cost Fairplay
Downward J.M.	Managing Ships Fairplay
Van Plantinga J.R.	Shipping for Profit: a Guide to Stevedoring Management Fairplay
Chrzanowski I.	An Intoduction to Shipping Economies Fairplay 1985
Astle W.E.	Shipping and the Law (1982) Fairplay 1982

Astle W.E.	The Hamburg Rules Fairplay 1981
Astle W.E.	Hague Rules Law Digest Fairplay 1981
Astle W.E.	Legal Developments In Maritime Commerce Fairplay 1983
Packard W.V.	Voyage Estimating 2nd Edition Fairplay 1981
Packard W.V.	Laytime Calculating Fairplay 1983
Packard W.V.	Time Chartering Fairplay 1980
Cesduni & Klnton	Practical Cookery
Fuller	Chef's Manual of Kitchen Management Chef's Compendium of Professional Recipes
Plumb	The Ship Steward's Manual
Llcrap	Food and Beverage Service
IMSO	Manual of Nutrition
Escoffier	Complete Guide to the Art of Modern Cookery
Cornell Maritime Press	Marine Cook's and Bakers Manual
Aston & Tiffney	Guide to Improving Food Hygience
Hobbs & Gilbert	Food Poisoning and Food Hygience
Wolter & Teubner	The Best of Baking-over 350 baking recipes and colour photographs.

* Also other reference book-list to follow.

* Also above to be supplied ONE copy EXCEPT Nories Nautical Tables which should be supplied in THIRTY copies.

* All to be Latest editions.

Annexure (b) (2)

REFERENCE BOOKS FOR ENGINE DEPARTMENT:

LEGEND:

MES : Marine Engineering Service

IME : Institute of Marine Engineers

MME : Marine Management England

AUTHOR/EDITION:	TITLE:	PUBLISHER:
Beeching L.I.	Engineering Science Questions & Answers	Marine Engineering Ser. 1975
Brockett W.A. 4th edition, 1978	Elements Applied Thermodynamics	Naval Inst. Pr.
Duffett, John	Modern Marine Maintenance,1973	Hearts Book
Europot Conference 1973	Wear, Lubrication & Repairs Proceedings	Intl. School BK. Service
2nd edition	Marine Boiler Question & Answers	MES
Ford Louis R.	Practical Marine Diesel Engineering	Pacific Bk. Supply
Frederick S.H. & Copper, H. 1977	Materials for Marine Machinery	IME Intl. School Bk. Serv.
Hatch Covers	Designs, Installations Marine Engineering	MME State Mutual Bk.
1981	Electricity Applied to Marine Engineering	MME State Mutual Bk.
Mc George, H.D.	General Engineering Knowledge	MES 1978 Sheridan
Norris A.	Commissioning & Sea Trials of Machinery in Ships	1979 IME Intl. School Bk. Ser.
1981	Operation of Mac inery in Motorships Main Diesels, Boilers & Auxiliary Plant	MME State Mutual Bk.
1979	Operations of Machinery in Ships Steam Turbines Boilers & Auxiliary Plant	IME Intl. School BK. Ser.
5th edition	Running & Maintenance of Marine Machinery	IME Intl. School Bk. Ser.

AUTHOR/EDITION:	TITLE:	PUBLISHER
1981	Simulator for Training for Seagoing Engineers	MME State Mutual Bk. Ser.
Sterling	Pumping Systems	MME State Mutual Bk.
Weddle, A.J.	Marine Engineering Systems As Introduction for Merchant Navy Officers	Sheridan
1980	Marine Engineering Bibliography	IME Sheridan
Donald K.M.	Marine Steam Turbines	MME Marine Media, London State Mutual Bk.
Milton J.H. et. al.	Running & Maintenance of Marine Machinery	MME State Mutual Bk.
Rayman A.A 1978	High Speed Marine Steam Engine	
Wakefield S.B.	Marine Propulsion Systems	MME State Mutual Bk.
Peter Kemp	Encyclopedia of ships and seafaring	IME
	Glossary of Marine Technology Terms	
Berry	Operation and maintenance of inert gas and Crude Washing Systems	
Robert J. Brady	Marine Fire Prevention Fire Fighting & Fire Safety	" orton
Rushbook	Fire Aboard	Brown Son & Ferguson
J. Rowlands & B. Angell	Corrosion for Marine and Offshore Engineers	IME

MARINE POLLUTION

Wardely- Smith	The Prevention of Oil Pollution	
Tanker Owners	Pollution Measures to Combat Oil, Pollution	
R.M.M. 'Gonigle & M. Zacher	Pollution, Politics and International Law	

AUTHOR/EDITION:	TITLE:	PUBLISHER:
-	Oil Spills: Their Fate and Impact on the Marine Environment	Companies International Marine Forum
-	Basic Electricity	Common Core Basic Technical Training Manuals:
-	Basic Electronics	
I.R. Sinclair	Understanding Electronic Components	
G.C. Loveday	Electronic Fault Diagnosis	
Noel Morris	Control Engineering	Mc Graw-Hill, London
Brogen	Semiconductor electronics with Worked Examples	
	SHIP CONSTRUCTION	
Kemp & Young	Ship Construction Sketches & Notes	
Taylor	Merchant Ship Construction	
Muckle	Naval Architecture for Marine Engineers	Newnes, London
	SHIP MANAGEMENT	
B.E.N. Thomas	The Management of Shipboard Maintenance	
	MARINE ENGINEERING SERIES:	
Butterworth	Marine Auxiliary Machinery	Newnes, London
Butterworth	Marine Steam Boilers	Newnes, London
Butterworth	Marine Diesel Engines	Newnes, London
Butterworth	Marine Electrical Practice	Newnes, London
Butterworth	Marine Steam Engines and Turbines	Newnes, London
Butterworth	Reed's Mathematical Tables and Engineering Formulates	Newness, London

AUTHOR/EDITION:	TITLE:	PUBLISHER:
	MARINE ENGINEERING PRACTICE	
	Marine Compressors	Marine Media, London
	Prime Movers for Generation of Electricity a.) Steam Turbines b.) Diesel Generating Set	Marine Media, London
	Marine Medium Speed Diesel Engine	Marine Media, London
	Refrigeration Machinery and Air Conditioning Plant	Marine Media, London
	Fire Fighting Equipment and its Use in Ships	Marine Media, London
	Application of Automatic Machinery and Alarm Equipment in ships	Marine Media, London
	Hydraulic Power Transmission in Marine Machinery	Marine Media, London
	Marine Steam Turbines	Marine Media, London
	Steering Gear	Marine Media, London
	Selecting Materials for Sea Water Systems	Marine Media, London
Rowlands	Corrosion for Marine and Offshore Engineers	Marine Media, London
May	Theory and Practice of Controllable Pitch Propellers	Marine Media, London
Skelly	Water Treatment	Marine Media, London
Beattie & Somerville	Ship's Gear: Review of Deck Machinery	Marine Media, London
Henshall	Slow Speed Diesel Engines Operations of Machinery in Motor Ships: Main Diesel Engines, Boilers and Auxiliary Plant	Marine Media, London
Sottern	Marine Diesel Oil Engine	Marine Media, London
Scale	Diesel Engines-questions and Answers	Marine Media, London

AUTHOR/EDITION:	TITLE:	PUBLISHER:
Bryan	Control Systems for Technicians	Marine Media, London
Morris	Control Engineering	Marine Media, London
Close & Yarwood	Introduction to Semiconductors	MaGraw Hill
Hughes & Hughes	Engineering Science in ST Units	Mc Graw Hill
Muckle	Naval Architecture for Marine Engineers	Mc Graw Hill
BSI 1170 1968	Treatment of Water for Marine Boilers	Mc Graw Hill
BSI 308a 1972	Student's edition of Engineering Drawing Practice	Mc Graw Hill
Bajpai	Engineering Mathematics	John Wiley & Sons
P. dee Smith	Deck Machinery	John Wiley & Sons
Rosenberg	Electric Motor Repair	John Wiley & Sons
Series	Steam and Gas Turbines for Marine Propulsion	John Wiley & Sons
Burghart & Kingsley	Marine Diesels	John Wiley & Sons
Cameron 2nd edition	Basic Lubrication Theory 2	Ellis Horwood Ltd.
Collacott	Mechanical Fault Diagnosis	
Hubert	Prevention Maintenance of Electrical Eqpt.	Mc Graw-Hill Book Company
Hanshell	Medium & High Speed Diesel Engines for Marine Use	IME
Laws	The running and Maintenance of Marine Machinery	
Shannon	Marine Gearing	
Donald	Marine Steam Turbines	
Shields	Ships Maintenance: A Quantitative Approach	
Freddrick & Capper	Materials for Marine Machinery Glossary of Marine Technology Terms	

AUTHOR/EDITOR:	TITLE:	PUBLISHER:
Sterling	Pumping Systems	
Woodward	The low speed Marine Diesel Engine	

HANDY MARINE ENGINEERING SERIES QUESTIONS AND ANSWERS

Yeandle	Mathematics	
Beeching	Engineering Science	
Roy	Steam Turbines and Gearing	
Flanagan	Marine Boilers	
Marton	Diesel Engines	
Flanagan	Feed Water Systems and Treatment	
Roy	Automatic and Control	
Reid & Flanagan	Practical Mathematics for Marine Engineers	
Lamb	Running and Maintenance of Marine Diesels	
Roberts	Practical Refrigeration for Marine Engineers	
Munton & Stott	Refrigeration at Sea	Applied Science Publisher Ltd., London
Mayhew & Rogers	Thermodynamics and Transport Properties of fluids	Applied Science Publisher Ltd., London
Hay wood	Thermodynamics Tables in SI	Applied Science Publisher Ltd., London

PERSONNEL MANAGEMENT AND RELATIONS ON BOARD SHIP

D.H. Moreby 1968	Personnel Management in Merchant Ships	Pergamon Press
-	Shipboard Change: the Seafarers Reaction	Sealife Programme

AUTHOR/EDITION:	TITLE:	PUBLISHER:
Vol. 1	Mathematics	Thomas Reed Publications Ltd.
Vol. 2	Applied Mechanics	Thomas Reed Publications Ltd.
Vol. 3	Heat & Heat Engines	Thomas Reed Publications Ltd.
Vol. 4	Naval Architecture	Thomas Reed Publications Ltd.
Vol. 5	Ship Construction	Thomas Reed Publications Ltd.
Vol. 6	Basic Electrotechnology	Thomas Reed Publications Ltd.
Vol. 7	Advanced Electrotechnology	Thomas Reed Publications Ltd.
Vol. 8	General Engineering Knowledge	Thomas Reed Publications Ltd.
Vol. 9	Steam Engineering Knowledge	Thomas Reed Publications Ltd.
Vol. 10	Instrumentation & Control Systems	Thomas Reed Publications Ltd.
Vol. 11	Engineering Drawing	Thomas Reed Publications Ltd.
Vol. 12	Modern Engineering Knowledge	Thomas Reed Publications Ltd.
C. Knack	Diesel Modern ships Engine and Machinery	GEC Gads Publications Copenhagen
Lamb	Running and Maintenance of the Marine Diesel Engine	C. Griffin and Co.
-	Merchant Ship Types	Marine Media Management Ltd.

AUTHOR/EDITION:	TITLE:	PUBLISHER:
	Pobductivity and Hierarchy aboard the Deep-Sea	Sealife Programme
	Crew Stability a nd Shipboard Management	Sealife Programme
	Glossary of Marine Technology Terms	The Institute of arine Engineers
	Question and Answers Series	Butterworth
	Diesel Engine	Butterworth
	Electric Motors	"
	Electric Wiring	"
	Electricity	"
	Electronics	"
	Pipework and Pipe Welding	"
	Computers	"
D.H. B acon	Engineering Thermodynamics	Butterworth
H.G. Beck	Engineering drawing for Marine Engineers	Reed's
S.G. Christingsen	Lamb's Questions and Answers on the Marine Diesel Engine	Griffin
	Marine Diesel Lubrication	Burmah Publication Castrol
J.P. Comstock	Principles of Naval Architecture	The Society of Naval Architects and arine Engineers
J. Crawforo	Marine and Offshore Pumping and Piping Systems	Butterworth
	Elementary Metal Course	Bundesinstint Fur Berufsbiloung Forshung, Berlin
W. Embleton	Applied Mechanics for Engineers	Thomas Reed
Merrignton	Marine Engineering	The Society of Naval Architects and Marine Engineers
	Hydraulics Vocational Drawing Course	Bundesinstint Fur Berufsbiloung Forshung, Berlin

AUTHOR/EDITION:	TITLE:	PUBLISHER:
L.T. DUNELL	Boiler Corrosion & Water Treatment	HMSO London
Smith	Deck Machinery	Cambridge Commel Press
E. Hughes	Engineering Science in SI Units	Longman, Singapore
M.E. Anderson	Question & Answers in Refrigeration	N ewnes, London
Mumo-Smith	Reeds Instrumentations and Control System	Technical Press Oxland
Clerk	Marine Diesel Lubrication	Gumek Castrol London

(4) Curriculum for the Upgrading of Masters and Chief Mates:

Regulation II/2

MANDATORY MINIMUM KNOWLEDGE FOR CERTIFICATION OF MASTERS AND CHIEF MATES OF SHIPS OF 200 GROSS REGISTER TONS OR MORE

1. The syllabus given below is compiled for examination of candidates for certification as master or chief mate or ships of 200 gross register tons or more. It is intended to expand and extend in depth the subjects contained in Regulation II/4 - "Mandatory Minimum Requirements for Certification of Officers in Charge of a Navigational Watch on Ships of 100 Gross Register Tons or More". Bearing in mind that a master has ultimate responsibility for the safety of the ship, its passengers, crew and cargo and that a chief mate shall be in a position to assume that responsibility at any time, examination in these subjects shall be designed to test thier ability to assimilate all available information that effects the safety of the ship.

2. Navigation and position determination

(a) Voyage planning and navigation for all conditions:

(i) by acceptable methods of plotting ocean tracks;

(ii) within restricted waters;

(iii) in ice;

(iv) in restricted visibility;

(v) in traffic seperation schemes;

(vi) in areas of extensive tidal effects.

(b) Position determination;

(i) by celestial observations, including the use of sun, stars, moon and planets;

(ii) by terrestial observations, including the ability to use bearings from landmarks and aids to navigation such as lighthouses, beacons and buoys in conjunction with appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting position fix;

(iii) using all modern ship electronic navigational aids to the satisfaction of the Administration, with specific expension to knowledge of thiers operating principles, limitations, sources of error, detection of misrepresentation of in-position fixing.

3. WatchKeeping

(a) Demonstrate through knowledge of content, application and intent of the International Regulations for Preventing Collisions at Sea, including those Annexes concerned with safe navigation.

(b) Demonstrate knowledge of Regulation II/I - "Basaic Principles to be Observed in Keeping a Navigational Watch".

4. Radar equipment

Demonstrate in conjunction with the use of radar simulator or, when not available, maneuvering board, knowledge of the fundamentals of radar and ability in the operation and use of radar, and in the interpretation and analysis of information obtained from this equipment, including:

(a) Factors affecting performance and accuracy;

(b) setting up and maintaining displays;

(c) detection of misrepresentation of information, false echoes, sea return, etc.;

(d) range and bearing;

(e) identification of critical echoes;

(f) course and speed of other ships;

(g) time and distance of element approach of crossing meeting or overtaking ships;

(h) detecting course and speed changes of other ships;

(i) effect of changes in own ships course or speed or both;

(j) application of the International Regulations for Preventing Collision at Sea.

5. Compasses - magnetic and gyro

Ability to determine and correct the errors of the magnetic and gyro-compasses and the knowledge of the means for correcting such errors.

6. Meteorology and oceanography

(a) Demonstrate the ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions.

(b) Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centre and the dangerous quadrants.

(c) Knowledge of ocean current systems.

(d) Ability to use all appropriate navigational publication on tides and currents, including those in the English language.

(e) Ability to calculate tidal conditions.

7. Ship maneuvering and handling

Maneuvering and handling of a ship in all conditions, including the following:

(a) maneuvers with approaching pilot vessels or stations with due regard to weather, tide, headreach and stopping distances;

(b) handling a ship in rivers, estuaries, etc., having regard to the effects of current, wind and restricted water on the response to the helm;

(c) maneuvering in shallow water, including the reduction in keel clearance due to the effect of squat, rolling and pitching;

(d) interaction between passing ships and between own ship and nearby banks (canal effect);

(e) berthing and unberthing under various conditions of wind and tide with and without tugs;

(f) choice of anchorage; anchoring with one or two anchors in limited anchorage and factors involved in determining the length of anchor cable to be used;

(g) dragging, clearing fouled anchors;

(h) dry-docking, both with and without damage;

(i) management and handling of ships in heavy weather, including assisting a ship or aircraft in distress, towing operations, means of keeping an unmanageable ship out of a sea through lessening drift and use of oil

(j) precautions in maneuvering for launching boats or lifecrafts in bad weather;

(k) methods of taking on board survivors from lifeboats or lifecrafts;

(l) ability to determine the maneuvering and engine characteristics or major types of ships with special reference to stopping distance and turning circles at various draughts and speeds;

(m) the importance of navigating at reduced speed to avoid damage caused by own ship's bow or stern wave;

(n) practiced measures to be taken when navigating in ice or conditions of ice accumulation on board;

(o) the use of, and maneuvering in, traffic seperation scheme.

8. Ship stability, construction and damage control

(a) Understanding fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve safe trim and stability.

(b) Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken.

(c) Demonstrate use of stability, trim and stress tables, diagrams and stress calculating equipment, including knowledge of loading cargoes and ballasting in order to keep hull stresses within acceptable limits.

(d) General knowledge of the principle structural members of a ship and the proper names of the various parts.

(e) Knowledge of IMCO Recommendations concerning ship stability.

9. Ship power plants

(a) Operating principles of marine power plants.

(b) Ship's auxiliary machinery.

(c) General Knowledge of marine engineering terms.

10. Cargo handling and stowage

(a) The stowage and securing of cargoes on board ships, including cargo gear.

(b) International regulations and recommendations relating to the carriage of cargoes, in particular the International Maritime Dangerous Goods Code (IMDG).

(c) Loading and discharging operations, with special regard to loading and discharging of heavy weights.

(d) Carriage of dangerous goods. Precautions to be taken during loading and discharging operations and the care of dangerous goods during a voyage.

(e) Working Knowledge of contents and application of current relevant tanker safety guides.

(f) Working Knowledge of commonly used cargo piping and pumping arrangements.

(g) Terms and definitions used to describe properties of common oil cargoes, such as crude oil, middle distillates, naptha.

(h) Pollution regulations; ballasting, task cleaning and gas freeing operation.

(i) Load-on-top procedures.

11. Fire prevention and fire-fighting appliances

(a) Organization of fire drills.

(b) Classes and chemistry of fire.

(c) Fire-fighting systems.

(d) Attendance at an approved Fire-fighting courses.

(e) Knowledge of Regulations concerning fire-fighting equipment.

12. Emergency procedures

(a) Precautions when beaching a ship.

(b) Action to be taken prior to, and after, grounding.

(c) Floating a grounded ship, with and without assistance.

(d) Action to be taken following a collision.

(e) Temporary plugging of leakages.

(f) Measures for the protection and safety of passengers and crew in emergencies.

(g) Limiting damage and solving the ship following a fire or explosion.

(h) Abandoning steering, rigging and use of jury steering and the means of rigging a jury rudder, where practicable.

(i) Rescuing person from a ship in distress or from a wreck.

(j) Man-overboard procedures.

13. Medical care

A thorough Knowledge of the use of the contents of the following publications:

(a) International Medical Guide for ships or equivalent national publications;

(b) Medical section of the International Code of Signals;

(c) Medical First-Aid Guide For Use in Accidents Involving Dangerous Goods.

14. Maritime Law

(a) A Knowledge of International Maritime Law as embodied in international agreements and conventions as they affect the specific obligations and responsibilities of the master, particularly those concerning safety and the protection of the marine anviroment. Regard shall be paid especially to the following subjects:

(i) certificates and other documents required to be carried out board ships by International conventions, how they may be obtained and the period of thier legal validity;

(ii) responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea;

(iii) responsibilities under the relevant requirements of the International Convention on load Lines;

(iv) responsibilities under international conventions for the prevention of pollution from ships;

(v) maritime declarations of health the requirements of the International Health Regulations;

(vi) responsibilities under the Convention on the International Regulations for Preventing Collision at Sea;

(vii) responsibilities under the International Instruments effecting the safety of the ship, passengers, crew and cargo.

(b) The extent of Knowledge of National Maritime Legislation is left to discretion of the Administration but should include national arrangements for implementing International Agreements and Conventions.

15. Personnel management and training responsibilities

A Knowledge of personnel management, organization and training aboard ships.

16. Communications

(a) Ability to transmit and receive messages by morse light and to use the International Code of Signals; Where the Administration has examined candidates in these subjects at the lower levels of certification, they may have the option of not re-examining in these subjects for certification as master.

(b) Knowledge of procedures used in radiotelephones, communications and ability to use radiotelephones, in particular with respect to distress urgency, safety and navigational messages.

(c) A Knowledge of the procedures for emergency distress signals by radiotelegraphy as prescribed in the Radio Regulations.

17. Life-saving

A thorough Knowledge of life-saving appliance regulations (International Convention For the Safety of Life at Sea), organization of abandon ship drills, lifeboats, lifecrfts and other life-saving equipment.

18. Search and rescue

A thorough Knowledge of the IMCO Merchant Ship and Rescue Manual (MERSAR).

19. Methods for demonstration of proficiency

(a) Navigation

Demonstrate the use of sextant, pelorus, azimuth mirror, ability

to plot posistion, course, bearings.

(b) International Regulations for Preventing Collision at Sea

(i) use of small models displaying proper signals or lights, or navigation light simulator;

(ii) maneuvering board or radar simulator.

(c) Radar

(i) radar simulator; or

(ii) maneuvering boards.

(d) Fire-fighting

Attendance at an approved Fire-fighting course.

(e) Communications

Visual and Vocal practical test.

(f) Life-saving

Launching and handling of lifeboats and other life-saving appliances, including and donning of life-jackets.

NATIONAL MARITIME POLYTECHNIC

M a n i l a

Rev._____

Course: Masters and Chief Mates Upgrading Hr. No. 01

Sublect: 1. Introduction to Masters & C/M. Upgrading Course

Method: L

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
5	Explanation & Presentation of course		

NATIONAL MARITIME POLYTECHNIC

M a n i l a

Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. 01

Sublect: 2. Navigation and Posistion Determination

Method: L & D

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. Voyage planning and Navigation for all conditions		
	1) Methods of plotting ocean tracks		
	a) Rhamb line		
	b) Great circle		
	c) Combined Rhamb - g.c.		
	2) Within restricted waters		
	a) Radar-Head up		
	b) Radar-Course up		
	c) Parallel indexing		
	3) In Ice		
	a) Chap. V Safety of Navigation Reg. 5/6&7 ------	SOLAS 74	
	4) In Restricted Visibility		
	a) Rule 19 conduct of vessels in restricted visibility a to e.		
	5) In traffic Separation Schemes		
	a) Rules applicable to the locality Reg. 8	SOLAS 74	
	b) Rules for Crossing		
	c) Rules for Overtaking		
	6) In areas of Extensive Tidal Effect		

NATIONAL MARITIME POLYTECHNIC

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Rev._____

Course: ~~Masters & Chief Mates Up-Grading~~ Hr. No. 02

Sublect: 2. Navigation & Posistion Determination

Method: L & D

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	b. Posistion Determination		
	1) Celestial observations		
	a. Sun		
	b. Stars		
	c. Moon		
	d. Planets		
	2) Terrestial observation		
	a. bearings from landmarks		
	b. bearings from aids to navigation		
	c. Radar Range & bearings		
	3) Electronics Navigation Systems		
	a. Radar		
	b. Satellite navigator		
	c. Decca navigator		
	d. Omega navigator		
	e. Loran C		
	f. RDF		
	g. Echo sounders		
	h. Operating principles limitations, detection of errors & method of correction of errors		

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M a n i l a

Rev._____

Course: Masters and Chief mates Up-Grading Hr. No. 03

Sublect: 3. Watch Keeping

Method: L & D

No. of min.	T O P I C S	Text/Ref.	Trng. Aids
25	a. International Regulation for Preventing Collision at Sea 1) Rule 5 - lookouts 2) Rule 6 - Safe Speed 3) Rule 7 - Risk of Collision 4) Rule 8 - Action to avoid Collision 5) Rule 19 - Conduct of vessels in restricted visibility	ARPA Manual appendixV pp. 125-128	Transparencis
25	b. Regulation II/1 - Basic Principles to be observed in keeping a navigational watch. 1) Watch Arrangements 2) Fitness for duty 3) Navigating 4) Navigational Equipment 5) Navigational duties and responsibilities 6) Lookout 7) Navigation with pilot embarked 8) Protection of the Marine Enviroment	STCW 78 Chapt. II pp. 20-22	Transparencis

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M a n i l a

Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. 04 to 05

Sublect: 4. Radar Equipment

Method: L,D prob. solving Radar Simulator

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
100	Demonstrate ability with the use of Radar simulator operation & use of Radar and in the interpretations and analysis of radar info. a) Factors affecting performance and accuracy b) Setting up and maintaining displays c) Detection of mis-representation of info, false echoes, sea return etc. d) Range and bearing e) Identification of Critical echoes f) Course and Speed of other ships g) Time and distance of CPA of crossing, meeting or overtaking ships h) Detecting course and speed changes of other ships i) Effect of changes in own ships course or speed or both j) Application of inter. reg. for preventing collision at sea	Radar Observer's Handbook for Merchant Navy Officers 6th ed. by W. Burger	

NATIONAL MARITIME POLYTECHNIC

M a n i l a

Rev._____

Course: MASTERS AND CHIEF MATES UPGRADING Hr. No. _____

Sublect: 5. Compasses - Magnetic Gyro

Method: L & D

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
75	A. Magnetic Compass		
	1. Errors		
	a. Variation		
	b. Deviation		
	2. Correcting Deviation errors (compass to true)		
	a. E. errors Additive		
	b. W errors Subtractive		
	c. Uncorrecting or true to compass reverse		
	3. Compass Compensation	Handbook of Magnetic adjustment	
	a. Ship's magnetic field		
	b. The half circle deviation		
	c. Permanent Magnets (bars)		
	d. Fluctivate Magnet (balls)		
25	B. Gyro Compass		
	1. Errors -		
	a. Latitude		
	b. Speed		
	2. Methods of correcting errors		

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M a n i l a

Rev._____

Course: Masters and Chief Mates Up-Grading Hr. No. _____

Sublect: 6. Meteorology and Oceanography

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. Demonstrate the ability to understand and interpret a synoptic chart and to forcast area weather	Meteorology for seamen by C.R. Burges	T 22,23,24
50	b. Characteristics of various weather system	- do -	
	1) Tropical Storm		T 8,9,10
	a, Formation		
	b. Precursory signs of Tropical storm		5 T 20
	c. Avoiding Tropical Storm		2 T 20
	d. Plan of a Depression		T 17
	e. Additional notes on the interpretation of analysis & prognosis messages		T 26
	2) Monsoons		
	3) Air Masses		
50	c. Ocean Currents	- do -	
50	d. Ability to use publications on Tides and Currents		
50	e, Ability to calculate Tidal Conditions		

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M a n i l a

Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Subject: 7, Ship maneuvering & handling

Method: L, C/B

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
100	1. Maneuvering and handling a ship in all conditions a. when approaching a pilot vessel or station with due regard to 1) weather 2) tide 3) headreach & stopping distance b. In rivers, estuaries, etc. having regard to the effects of 1) current 2) wind 3) response to the helm c. In shallow waters as regards 1) squat 2) rolling & pitching d. Interaction between passing ship and between ownship and near banks (canal effect) e. Berthing and unberthing 1) under various conditions of wind 2) use of tugs 3) without tugs f. Choice of anchorage 1) use of one or two anchors 2) lenght of anchor cable g. Dragging, clearing fouled anchor h. Dry-docking, both with and without damage i. In heavy weather including 1) assisting a ship or aircraft in distress 2) towing operations 3) use of oil j. Launching boats or liferafts in bad weather		

NATIONAL MARITIME POLYTECHNIC

M a n i l a

Rev. _____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 7, Ship maneuvering & handling

Method: L, C/B

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
	k. methods of taking onboard survivors from boats and liferafts l. Ability to determine 1) stopping distance 2) turning circles at various draughts & speeds m. The importance of reduced speed to avoid damage caused by own ships' bow or stern wave n. Practical measures to be taken when navigating in 1) ice 2) conditions of ice accumulation on board o. In traffic separation scheme 1) overtaking 2) crossing the traffic separation		

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M a n i l a

Rev. _____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Subject: 8, Ship Stability, Construction & Damage Control

Method: L, C/B

No. of min.	T O P I C S	Text/Ref.	Trng. Aids
100	a. Fundamental principles 1) Ship construction 2) Theories affecting trim & stability 3) Measures necessary to preserve safe trim and stability b. Knowledge of the effects on trim & stability 1) In the event of the damage to and consequent flooding of a compartment 2) Counter measures to be taken c. Demonstrate use of 1) Stability & trim tables 2) Stress tables 3) Ballasting 4) Loading & stress calculating equipment d. General knowledge of the principal structural members of a ship and the proper names of the various parts e. Knowledge of IMO recommendation concerning ship stability	SOLAS 74	

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Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 9, Ship Power Plants

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. Marine Main propulsion plants b. Ship's Auxillary Machinery c. General knowledge of marine engineering terms		

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Course: Masters & Chief Mates Up-Grading Hr. No. _____

Subject: 10, Cargo handling and stowage

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
100	a. Knowledge of 1) Cargo gears on board own ship 2) Cargo stowage & securing of cargoes b. Loading and Discharging 1) Special regards to heavy weights 2) Delicate & fragile cargoes c. International regulations & recommendations relating to the: 1) carriage of cargoes in general 2) carriage of dangerous goods (IMDG) d. Precautions during 1) Loading & discharging operations of dangerous goods 2) Care of dangerous goods during a voyage e. Pollution regulations, ballasting, tank clearing & gas freeing operations f. Load on top procedures		

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Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 11. Fire prevention and fire-fighting appliances

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. The participant of this course must be certificated in a special package course offered by the NMP b. For the purpose of this course the participant must be reviewed on 1) Classes & chemistry of fire 2) Fire-fighting systems 3) Knowledge of regulations concerning fire-fighting equipment		

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Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 12. Emergency procedures

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. Precautions when beaching a ship b. Action to be taken prior to, and after, grounding c. Floating a grounded ship with and without assistance d. Action to be taken following a collisi on e. Temporary plugging of leaks f. Measures for the protection & safety of passengers and crew in emergencies g. Limiting damage and salving the ship following a fire or explosion h. Abandoning ship i. Emergency steering, rigging and use of jury steering and the means of rigging a jury rudder where practicable j. Rescuing persons from ship in distress or from a wreck k. Man over board procedures		

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Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 13. Medical Care

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. The participant of this course must have attended the special package course offered at NMP Taclobar & duly certificated b. The participant must then be reviewed on 1) International Medical guide 2) Medical section of the international code of signals 3) Medical First Aid Guide for use in accidents involving dangerous goods		

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Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 14. Maritime Law

Method: L. C/B .

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
200	a. Knowledge of international maritime law as embodied in international agreements and conventions as they affect the specific obligations & responsibilities of the master. Special regards to: 1) Certificates & other documents required to be carried on board ship by international convention, how they are obtained & the period of their legal validity 2) Responsibilities under the relevant requirement of the international convention on Load Lines 3) Responsibilities under the relevant requirement of the International Convention for the safety of Life at Sea. 4) Prevention of pollution from ship 5) Maritime declaration of health 6) Prevention of Collision at Sea 7) Responsibilities under other international instruments affecting the safety of the ship passengers, crew and cargo b. Knowledge of national arrangements for implementing international agreement & convention.		

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Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 15. Personnel Management & Training Responsibilities

Method: L

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. Personnel Management b. Human relations & discipline on boardship c. Training on board 1) Fire drills 2) Boat drills 3) Abandon ship drills 4) Man over board drills		

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M a n i l a

Rev. _____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 16. Communications

Method: _____

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
100	a. Ability to 1) transmit and receive messages by morse light 2) use of international code of signals b. Knowledge of procedures in radiotelephone 1) distress 2) urgency 3) safety & navigational messages c. Knowledge of the procedures for emergency distress signals by radiotelephony		

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Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 17. Life-Saving

Method: L & Movies

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
50	a. Participants of this course must have attended the package course offered at NMP Tacloban and possess a certificate		
	b. The participant must then be reviewed on the following:		
	1) Life saving appliances regulations	SOLAS 74	
	2) Abandonship drills		
	3) Lifeboat and liferafts drills		
	4) Use of liferings and buoys.		

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M a n i l a

Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 18. Search and Rescue

Method: L. & Movies

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
250	The Merchant Ship Search and Rescue Manual (MERSAR) 1980	MERSAR 1980	
	a. Introduction		
	1. Purpose 2. Categories of distress incidents 3. Obligations and responsibilities 4. Position reporting systems 5. Abbreviations		
	b. Chapter I - coordination of search and rescue operations		
	1. Requirements for coordination 2. Coordination by land based authorities 3. On scene coordination		
	c. Chapter 2 - action by a ship in distress		
	1. Transmission of the distress message 2. Components of the distress message 3. Direction - finding and homing 4. Cancellations of distress messages 5. Training		
	d. Chapter 3 - action by assisting ships		
	1. Distress call and message 2. Immediate action 3. Proceeding to the area of distress 4. On board preparation 5, Aircraft casualties 6. Establishment of the CSS 7. Visual identification of the CSS 8. Control of inter-ship radio communications 9. Approaching the scene 10. Arrival on scene- search procedures		
	e. Chapter 4- Assistance by SAR Aircraft		
	1. General 2. Assistance by helicopters		
	f. Chapter 5 - Planning and conducting the search		
	1. General 2. Responsibility of CSS 3. Definitions		

NATIONAL MARITIME POLYTECHNIC

M a n i l a

Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 18. Search and Rescue

Method: L. & Movies

No. of min.	T O P I C S	ext/Ref.	Trng. Aids
	4. Planning the search 5. Visual search 6. Radar search 7. Interval between ships 8. Searching speed 9. Search patterns 10. Initiation of search 11. Restricted visibility 12. Further action on completion of initial phase 13. Use of ship/aircraft Co- ordinated patterns 14. Evidence of casualty found 15. Maneouvering instructions 16. Standard texts of messages g. Chapter 6 - *Conclusion of search* 1. Search successful rescue 2. Search unsuccessful h. Chapter 7 - Communications 1. Marine radiocommunications facilities available for distress purposes 2. Visual communication facilities 3. Communications with assisting aircraft 4. Directing a ship to the location of a distress i. Chapter 8 - Aircraft casualties at Sea 1. Aircraft/ship *communications* 2. Distress signals 3. Action taken to render assistance if aircraft is still airborne 4. Rescue action 5. Questioning survivors	MERSAR 1980	

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M a n i l a

Rev._____

Course: Masters & Chief Mates Up-Grading Hr. No. _____

Sublect: 19. Methods for domonstration of proficiency

Method: _____

No. of min.	T O P I C S	Text/Ref.	Trng. Aids
50	a. Navigation		
	1. Demonstrate the use of sextant		
	a) sun shot b) star sight c) determine indexerror		
	b. International Regulations for Preventing Collision at Sea		
	1. By use of small models display proper signals or lights		
	2. Maneouvering board solution		
	3. Radar simulator collision avoidance		
	c. Radar		
	1. By radar simulator- setting up radar		
	2. Observing other ship maneouvering (w/o solving by maneouvering boards)		
	3. Ship on parallel courses		
	d. Fire-fighting		
	1. Extinguishing agents		
	2. Extinguishing methods		
	3. Preventing re-ignition		
	e. Communications		
	1. Visual practical tests		
	2. Vocal practical tests		
	f. Life-saving		
	1. Donning a life-jacket		
	2. Jumping from a flatform 10 ft. high		
	3. Launching and handling lifeboats & liferafts		

(5) Third and Fourth Engineers' Upgrading Course :

UPGRADING COURSE (Eu)

C O N T E N T S

Module No. Eu 1 - Chemistry

35 lessons - 25 hrs self study - written examination

Aim : Ability to solve chemistry problems concerning lubrication oil, fuel oil, combustion, feed water, corrosion, refrigerants and fire extinguishing agents.

Subjects :

- Chemical compounds
- Formation of gas, state of matter and change equation.
- Aogadro's law
- Acids, bases, salts, ions and valence
- Hydrogen, oxygen
- Atomic and molecular weights, molecular dilution and molar weight.
- Sulphur and sulphur compounds
- Ammonium
- Hydrazine
- Nitrogenous gas
- Nitric acid
- Phosphorous
- Carbon
- Liquids, solid substances, amorphous and crystalline substances
- Feed water treatment
- Electro-chemical processes

References : NMP Compendium

Module No. Eu 2 Physics

35 lessons - 25 hrs. sef study - written examination

A i m : Ability to understand and calculate the forces and recognize the factors involved in (1) closed fluid systems and (2) mechanical devices found on board a merchant vessels.

Subject :

- Viscosity and density of fluids
- Pipe resistance
- Pump capcity and power demand
- Humidity calculation and calculation of heat contents in air (I - x chart)
- Compressed air, humidity and heat formation
- Accelaration, speed, inertia, stresses and moment of inertia
- Thermodynamics
- Heat transmission
- Forces on an inclined plane
- Composition of forces
- Bending moments and bending stresses
- Torsional moment and torsional stresses

References: NMP compendium

Module No. Eu 3 - Mathematics

35 lessons - 25 hrs. self study - written examination

A i m : Training in mathematics is not an aim in itself; it helps the student, however, in understanding and solving engineering problems.

Subjects :
- Algebra
- Analytical plane geometry
- Trigonometry
- Vectors
- Area calculation
- Differential equations
- Integral calculus
- Logarithms and exponential functions
- .Stereometry

References : NMP compendium

Module No. Eu 4 A Electrotechnology

35 lessons - 25 hrs. self study - written examination

Aim : To acquire basic knowledge in electricity and electronics, and to acquire familiarity with related shipboard equipment

Subjects :
- Electrotechnology, electrical measurements, converters, digital circuits and oscilloscopes.
- Direct current machines
- Alternating current theory, A.C machines, phase compensation, selecticity, synchronous alternators, parallel running.
- A.C. installations, main distribution systems, switchboards and switchboard equipment.
- Control and correction, transductors and transformer amplifiers.
- Electronic fundamental materials, cables, fuses, switches, resistors, capacitors and coils
- Electrical transfer systems, indicator installations, engine controls, engineroom telegraphs recording and log indicator systems and gyro compasses.

References : NMP compendium

Module No. Eu 5 - Marine diesel engines

11 lessons - 24 hrs. lab. exp. - 25 hrs. self study
written exmaination

A i m : Ability as required to serve as assistent engineer aboardship and knowledge in the operation, maintenance and repair of marine diesel engines. Ability to evaluate engine performance.

Subjects :

- Oils
- Diesel engine working process
- Evaluation of engine performance
- Cylinders, pistons and rings
- Bearings and journals
- Engine operational disturbances
- Salt water and fresh water cooling systems, lubricating and fuel oil systems
- Engine checks during out-of-service periods, and when in operation
- Schematic pipe diagrams
- Engine operation and maneuvering
- Safety precautions

References ; NMP compendium

Module No. Eu 6 - Marine Electricity

10 lessons - 15 hrs. lab. exp. - 35 hrs. self study - written examination

A i m : - To acquaint the students with the operational and maintenance of shipboard installations used in the generation, distribution and effective use of electbic energy on board a merchant vessel.

subjects :
- Electrical diagrams
- Generators and alternators
- Direct current motors and controllers
- Alternating current motors and controllers
- Shipboard distribution systems
- Transformers
- Metering techniwues
-, Shore connections
- Operation, maintenance and safe working practices

References : NMP compendium

Module No. Eu 7 - Auxiliary Machinery

9 lessons - 24 hrs. lab. exp. - 27 hrs. self study - written examination

Aim : To enable third and fourth marine engineers to operate and maintain shipboard auxiliary machinery

Subjects :
- Pumps
- Fans
- Oil seperators
- Oil strainers
- Waste oil systems, tanks and seperators.
- Waste water cleaning plants (sewage)
- Incinerators
- Air filters
- Main shafts
- Bearings
- Stern tubes
- Piping systems
- Fresh water generators (distilling plants)
- Shipboard fresh water pressure systems
- Hot water systems

References; NMP compendium

Module No. Eu 8 - Control and remote control systems

10 lessons - 25 hrs. lab. exp. - 25 hrs. self study - written examination

A i m : Brief knowledge on the principles on which automatic control systems, remote control systems and control panels are built.

Ability and practical knowledge on their tending and keeping in repair.

Subjects :
- Open loop control system
- Closed loop control systems
- Automatic controlling
- Governor - proportional (P)
- Governor - integral (I)
- Governor - differential (D)
- Governor systems combined (PI) and (PID)
- Opto-electronics
- Transfer systems: Electric, pneumatic, mechanical and hydraulic
- Universal monitoring system, brudge console and control room console.
- Automatic fire alarm switchboard, thermo and ion detectors.
- Engine watch alarm system
- Exhaust temperature watch: Thermo monitors
- Automatic pump starting and running
- Fresh water generator control
- Automatic controlling of auxiliary boiler
- Engine telegraph: Synchro-stop and push-bottom types
- Log apparatus, navigation lights and gyro-compasses

References : NMP compendium

Module No. Eu 9 - Basic engineering for marine steam propulsion plants.

7 lessons - 30 hrs labd exp. -23 hrs. self study - written examination

A i m : To acquire the student with a marine steam propulsion plant, to familiarize them with its several components and the function of each.

To enable the student, by conducting laboratory experiments, to acquire a working knowledge of, and confidence in the operation and maintenance of a marine steam plant.

Subjects :
- Heat transfer
- Thermodynamics
- Boilers and ancillary system
- Propulsion turbines and ancillary systems
- Starting and securing a steam turbine propulsion plant
- Steam plants for electric power generation
- Miscellaneous steam plant items; maintenance materials.
- Safety for personnel and equipment.

References: NMP compendium

Module No. Eu 10 - Mechanics, hydromechanics and hydraulics

10 lessons - 25 hrs. lab. exp. - 25 self study - written examination

A i m : Knowledge on theoritical and practical operations of mechanical, pneumatic and hydraulic equipment their applications and ability to avaluate their performance.

Subjects :
- Symbols - pneumatic/hydraulic
- Pheumatic and hydraulic diagrams
- Pneumatice control systems (logic)
- Pneumatic in general
- Pneumatic pumps
- Pneumatic motors
- Pneumatic level transmitters
- Hydraulics in general
- Hydraulics pumps
- Hydraulics motors
- Hydraulics control
- Hydraulic cylinder
- Hydraulic steering engines
- Mechanical mechanisms
- Mechanical systems
- Calculation of forces on simple mechanical systems

References : NMP compendium

Module No. Eu 11 - Refrigeration and airconditioning

10 lessons - 25 hrs. lab. exp. - 25 hrs. self study - written examination.

A i m : To acquiant the attendees with the shipboard refrigeration and air conditioning systems and to familiarize them with the working principles of the vapor compression refrigerator and air conditioner.

Subjects :
- Theory of refrigeration
- Methods of cooling cargo spaces in a conventional refrigerated ship.
- General description of froon-12 refrigerating machinery
- Pressure testing, purging, dehydration and charging the system and testing for leaks
- Operations and trouble diagnosis; care and maintenance.
- General description of ammonia refrigeration plant.
- Properties and handling of ammonia
- Theory of air conditioning and the use of the psychrometric chart
- Familiarization on the working principles of refrigeration and air conditioning by conducting laboratory experiments.

References: NMP compendium

Module No. Eu 12 - Machine shop practice, safe working practice and repair procedures.

8 lessons - 28 hrs. shop practice - 24 hrs. self study - written examination

A i m : Ability to handle and operate precision instruments and special tools. To acquire knowledge and experience in repair ptocedures and safe working practice.

Subjects :
- Measuring instruments
- Caliberation instruments
- Special tools
- Lathe machines
- Milling machines
- Cutting and welding machines
- Drills and grinding machines
- Safety precautions
- Machine shop practice

References: NMP compendium

(6) Curriculum for Radar Simulator Course (RSC):

P R O M U L G A T I O N

The curriculum for RADAR SIMULATOR COURSE contained herein is hereby approved for implementation in the National Maritime Polytechnic land-based training centers or shipboard for the purpose of upgrading the proficiency and competence of Navigating Officers.

BENJAMIN M. TAÑEDO
CAPT. PN(MNSA)Ret.
President
National Maritime Polytechnic

C U R R I C U L U M

F O R

R A D A R S I M U L A T O R

C O U R S E

COURSE OVERVIEW

Radar Simulator Course

I. Aim – To promote decision – making based on data supplied by navigational instruments, a full appreciation of system errors, a thorough understanding of the operational aspects of modern navigation systems and effective bridge teamwork procedures.

Objective – At the end of the training, the officer should be able to evaluate navigational information derived from all sources in order to make and implement command decisions for collision avoidance and for directing the safe navigation of the ship.

Training plan: In drawing up the training plan, it is assumed that participants are proficient in basic parallel INDEXING radar plotting and passage planning procedures.

The course will consist of:

a. Orientation on the layout of the radar simulator room and the equipment installed therein, to insure that they know how to use the equipment before going into the actual exercises.

b. The exercises are designed in four stages

Stage 1 Collision avoidance in open waters.
Stage 2 Navigation and collision avoidance
Stage 3 Search and rescue
Stage 4 Navigation and collision avoidance involving approaches to and passage through areas of heavy traffic.

The course will be run as a fulltime block of 60 hours.

Course programme – The course programme and exercises to be conducted are shown under tab 2.

Equipment – The equipment for the conduct of this course is given and described under tab 3.

Entry to the course:– Participants for this course must at least be a holder of 3rd mate license and must have a minimum of 18 months service as watchkeeping officer. Other students who do not comply with the above requirements may be allowed entry to this course at the descretion of the President of the NMP and may be issued a certificate of attendance.

Conduct of course: - In implementing the exercises to meet the stated objectives, the following guidelines should be taken into account:

1) the exercises should be intensive and appropriate to the maturity and grade of the students
2) the invironment in which the exercises are conducted must be conducive to learning through participation rather than formal classroom teaching or lectures
3) the roles played by the participants must be representative of the real situation to enable bridge teamwork procedures to be followed
4) Before each exercise the participants must be briefed of what the exercise will be. After the exercise there should be a general discussion among themselves, when the exercise will be analysed and actions criticised.

Assessment: - Students' performance and understanding of the basic principles on which the exercises are based should be closely monitored by the instructors as a form of continuous assessment throughout the course. There will be no formal examination at the end of the course.

Certificate - A Certificate of Attendance will be issued to officers who attended and satisfactorily participated in the exercises.

COURSE PROGRAMME

Course Programme and Exercises

1. Introduction

1.1 The course programme include exercises in seven "playing areas" and the duration of exercises range from 30 minutes to at most two hours, allowing sufficient time for briefing and debriefing for each exercise.

2. Design of exercises

2.1 The design and conduct of exercises should take into account that:

.1 the use and operation of the full range of navigational equipment specially radar, have been studied.

.2 the principles of keeping a safe navigational watch, chart work, passage planning and bridge team work were studied, and that the radar simulator course will reinforce the application of the principles involved through the extremely practical and realistic nature of the exercises.

2.2 In meeting the stated objectives of the course, due regard should be paid to:

.1 planning and execution of passages in confined and open waters.

.2 the use of radar for anti-collision navigation and blind pilotage.

.3 the selection and use of other navigation equipment and data as appropriate to prevailing circumstances.

.4 other services and information such as weather reports and the use of radiotelephone.

2.3 Effective bridge teamwork procedures should be emphasised throughout the course.

3. Organization

3.1 To achieve the objectives of the course and at the same time maximize the use of the equipment installed at the radar simulator the number of participants per ownship position must not exceed four.

4. Team Roles

4.1 The roles played should be representative of the real situation to enable bridge teamwork procedures to be followed. For example, it is expected that the Master will act as the receiver/co-ordinator of information and will make overall decisions for the safe conduct of the ownship while the officer of the watch will have a primary role in the conduct of the exercise appropriate to the duties of an officer incharge of a navigational watch,

assisted by the third team member, the fourth acting as helmsman and engine controller. Suitable publications, e.g. admiralty pilot books and tide tables should be available for this purpose.

4.2 Roles should be changed as appropriate during the course to give each student ample opportunity in command of ownship and to operate equipment at each ownship position.

EQUIPMENT

1. GENERAL

1.1 The Radar Simulator is designed to enable training in the use of radar and ARPA as required for ship masters and deck officers under IMO Resolutions A.483 (XII), Training in Radar Observation and Plotting, and A.482 (XII), Training in the use of Automatic Radar Plotting Aids.

1.2 The FURUNO Radar Simulator is a four-own-ship system provided with one each radar display unit and ARPA display unit in each own ship cubicle.

1.3 The system offers following trainings in utmost reality and accuracy:

.1 Radar/ARPA operation and interpretation
.2 Relative and true motion radar navigation technique
.3 Plotting for collision avoidance
.4 Ship maneuvering in confined channels, rivers and estuaries
.5 Recognition of dangerous situation and evasive maneuver
.6 Deliberate collision or stranding and later analysis of situations
.7 Fog signals by lamp for 4 Own Ships

2. DESIGN CONDITION

2.1 The system operates on a main supply of 220VAC, 60Hz, 3 phase. 10KVA (Max)

2.2 The system is designed to comply with the following environmental conditions:

.1 Ambient Temperature
Operating: +10°C to +30°C
Non-operating: 0° to +45°C

.2 Humidity
Operating: 10% to 80% relative
Non-operating: 5% to 95% relative

2.3 The system is of modular design for ease of maintenance, and fully solid-state for high reliability of except CRTs for radar displays, ARPA displays and display terminals of the computer.

2.4 Own ship radar displays comply with IMO Resolution A.477 (XII), Performance Standards for Radar Equipment.

2.5 ARPA displays comply with IMO Resolution A.422 (XI), Performance Standards for Automatic Radar Plotting Aids (ARPA), and the U.S. Coast Guard's Performance Standars.

2.6 The computer accomodates the back-up power supply to protect memory. For a blackout which lasts within 20 minutes, an exercise can be restored by executing the restarted procedures.

3. EQUIPMENT LIST

3.1 Own Ship Cubicles

.1	Bridge Console	4 units (1 unit/cubicle)
.2	Own Ship Radar Display Unit(16")	4 units (1 unit/cubicle)
.3	ARPA Display Unit (16")	4 units (1 unit/cubicle)
.4	Repeater Display Unit (16")	4 units (1 unit/cubicle)
.5	Chart Table	4 pcs. (1pc./cubicle)
.6	Nautical Charts	100 copies (see list attached)
.7	VHF Radiotelephone	4 units (1 unit/cubicle)

3.2 Intructor's Cubicle

.1	Instructor's Console With Display Terminal and keyboards	1 unit
.2	Monitor Display Unit (16")	1 unit
.3	X-Y Recorder	1 unit
.4	Printer	1 unit
.5	Blank Tape	3 pcs (120 min. each)
.6	VHF Radiotelephone	1 unit

3.3 Central Processing Cubicle

.1	Digital Computer Unit	1 unit
.2	Echo Generator (1)	1 unit
.3	Echo Generator (2)	1 unit
.4	Coastline Generator	1 unit

3.4 Briefing Room

.1	Color Monitor Display (14")	1 unit
.2	Maneuvering Board	2 units

3.5 Others

.1	Automatic Voltage Regulator	1 unit
.2	Topography Editing Unit	1 unit
.3	Intercommunication System	1 set
.4	Interconnection Cables	1 set
.5	Maintenance Manual	8 copies
.6	Instruction Book	25 copies
.7	Spare Parts and Specific consumables for 2 years.	1 set (see list attached)

4 FUNCTIONAL SPECIFICATIONS

4.1 Number of Simulated Ships

The Radar Simulator has the capability of simulating four (4) own ships and twenty (20) target ships simultaneously.

4.2 Mathematical Models of Own Ship

4.2.1 Mathematical models of own ship's characteristics include at least the following five own ship types, each in both full-load and ballast conditions:

.1 VLCC (230,000 DWT)
.2 Bulk carrier (120,000 DWT)
.3 Container ship (30,000 DWT)
.4 General cargo vessel (20,000 DWT)
.5 30 knot ferry boat

4.2.2 There is a means for the instructor to easily change maneuvering characteristics of the preprogrammed own ship types, and program additional own ship types including hovercraft.

4.3 Exercise Program

4.3.1 The supplied software package contains five (5) different kinds of preprogrammed exercise scenarios of different areas which are readily applicable to actual training routine.

4.3.2 There is a means for the intructor to locally produce exercise programs by determining own ships types, number of target ships, initial positions of all ships, target ships' speed and course with changes, tide/wind effects, etc.

4.3.3 Exercise programs are stored on the magnetic disk memory so that the instructor can repeat the same exercise for different students.

4.3.4 The following five (5) kinds of exercise area are supplied

.1 Dover Strait
.2 Hormuz Strait
.3 Malacca Strait
.4 Osaka Bay
.5 Kurushima Strait or Bisan-Seto (to be selected by the client)

Drawing of exercise area for client's selection is attached.

4.4 Execution of Exercise

4.4.1 The instructor can change the contents of exercise program before the commencement of each exercise.

4.4.2 The Simulator is capable of providing the following training modes under the same exercise area:

.1 Four own ships to join the same exercise program. Each own ship is visible from the other own ships.
.2 Four own ships undergo the same exercise, but each own ship is invisible from the other own ships.
.3 Four own ships undergo different exercises individually. Each own ship is invisible from the other own ships.
.4 Two own ships undergo the same exercise, and the other tow own ships undergo another exercise. Own ships in the same exercise are visible each other, but invisible from the other two own ships.

4.4.3 To enable the aforesaid training modes there is a control to mask each own ship from other own ships.

4.5 Simulating Functions

4.5.1 The Simulator generares signals for ship targets, land targets, own ship's marker, north marker, sea clutter, precipitationclutter, receiver noise, buoys and radar beacons.

4.5.2 Two of the other ships nearest to the Own ship at short ranges appear in realistic sizes and shapes on the radar screen according to the instructor-preset ship types.

4.5.3 Sea clutter range is variable to a maximum of 8 n. miles and its intensity is sufficient to mask appropriate targets.

4.5.4 Precipitation clutter is presettable in its pattern, position, movement, size and level.

4.5.5 The coastline generator produces echoes of landmass, ports, harbours, estuaries, buoys, etc. utilizing the digital synthesis technique.

4.5.6 Coastline shadow effects are simulated with contour line information of the toppography so that the appearance of land targets varies realistically as the aspect from own ship changes.

4.5.7 Effects of own ship's yew are simulated with variable rate and angle of yawing. Yaw control for Own ships: Selectable from 0^{0} to + 5^{o}.
Rate of swing variable from 20^{o} to 120^{o} per minute.

4.5.8 The Simulator is capable of applying the effects of tidal streams either simultaneously to all ships or individually to each own ship. Tide speed is variable between 0 and 9.9 knots in 0.1 knot steps and direction between 0 and 359^{o} in 1^{o} steps.

4.5.9 The Simulator is capable of applying the wind effects to all own ships. Wind velocity is variable between 0 and 99 knots in 1 knot steps and direction between 0 and 359^{o} in 1^{o} steps.

4.5.10 Range fall-off for targer ships ans other own ships is realistic and compatible with the simulated own ship's antonna height.

4.5.11 Fog Signal:
In the projected layout of the training room, all four Own Ship cubicles are closely installed to each other although seperation walls are provided. To avoid interference to other Own Ship trainees, an audible signal will not be employed and a fog signal will be given by lamps to warn t e operator of t he fog signal status.

Instructor can monitor "Own Ships" use of fog signals and input fog signals into any one more "Own Ships".

4.5.12 Error Simulation:

The following malfunction and errors can be generated by the Instructor's Cubicle.

.1 Radar failure for any Own Ship
.2 Speed indication error
.3 Speed indication failure
.4 Heading marker error
.5 Autopilot failure

4.5.13 Intercommunications

Intercommunications, ship-to-ship or ship-to instructor's cubicle, are made by the interphone network. Handset receivers are used for respective cubicles.

4.5.14 ARPA Interface

One of 4 ARPA's is Sperry CAS II and other 3 sets are FURUNO'S make.

4.5.15 Video Recorder Output

Each repeater display unit is provided with the output terminal to which the video recorder can be connected for recording the radar picture under exercise.

4.6. Facilities at Instructor's Position

4.6.1 Facilities at the instructor's position comprise an instructor's console associated with a display terminal and keyboards, a monitor display, an X-Y recorder and a printer.

4.6.2 Instructor's Console

4.6.2.1 The instructor's console allows the instructor to carry out exercise programming, control and monitor the progress of exercise.

4.6.2.2 The display terminal gives an alpha-numeric presentation of various exercise parameters in the character mode, and ship's track or vector presentation in the graphics mode.

4.6.2.3 A digital clock with a means of time setting is provided at the instructor's console.

4.6.2.4 Provision is made for the instructor to perform the following operations as well:

.1 Freeze and restart of exercise (An indication is given at the trainee's positions to show the "freeze" condition).

.2 Video On/Off of any target ships

.3 Halting the movement of any target ships

.4 Manual change of speed and/or course of any target ships

.5 Time factor for changing speed of the exercise to necessary exercise scene during the playback of the exercise.

4.6.3 Monitor Display

The 16" monitor display acts as a slave monitor to any of the own ship radar displays. It is provided with indications for the range in use and presentation mode.

Display Mode: Relative motion North-up and Heading-up

4.6.4 Printer

The printer provides hard copies of exercises programs, own ship's characteristics and other programmed data. It is also used to record the progress of exrcise including the trainees' actions.

4.6.5 X-Y Recorder

4.6.5.1 This is multi-color X-Y recorder which is capable of plotting ship tracks with identification numbers.

4.6.5.2 The X-Y recorder is capable of handling up to four own ships and twenty target ships simultaneously of which at least four own ships are identified by different colors of course plot.

4.6.5.3 The X-Y recorder is capable of making course plot in different settings or modes individually for each own ship.

4.7 Facilities at Own Ship Positions

4.7.1 A bridge console is provided at each own ship position incorporating the following facilities:

.1 Push-button type engine telegraph

.2 Steering wheel

.3 Rudder angle indicator for command

.4 Rudder angle indicator for achievement

.5 Gyro repeater with course setter and course indicator

.6 Speed indicator

.7 Distance run indicator

.8 Digital clock

.9 Rate-of-turn indicator

.10 Fog signal facility

.11 Warning for collision

.12. Intercom-handset (for communication with the instructor or between trainees).

.13 Depth indicator

4.7.2 The engine telegraph allows the following speed settings relative to the maximum speed or astern programmed for each own ship:

.1 FULL AHEAD (Navigation Full & Harbor Full)
.2 HALF AHEAD
.3 SLOW AHEAD
.4 DEAD SLOW AHEAD
.5 STOP ENGINES
.6 DEAD SLOW ASTERN
.7 SLOW ASTERN
.8 HALF ASTERN
.9 FULL ASTERN

Note: Speed setting shall be decided later.

4.7.3 Own ship's course setting can be made either manually by the steering wheel or automatically by the course setter.

4.7.4 For each of the radar displays, other than the ARPA displays, a reflection type plotting device is provided.

4.7.5 A repeater display is provided at each own ship position working as a slave display to the relevant own ship radar display. The repeater displays are of the identical design with the master display and allow waiting students to undertake basic operation exercises.

Display Mode: Relative Motion North-up and Head-up.

4.7.6 A chart table 2m long, 1.1m wide and 0.9m high with 8 chart drawers, a desk lamp, a dimmer control, a chronometer box add a lock is provided.

4.8 Fabrication of Topographic Data

The topography editing unit operated in combination with the X-Y recorder, which works as a digizer, allows the instructor to fabricate topographic data for the desired playing area.

4.9 Radar Color Monitor

14" Radar Color Monitor linked with one "Own Ships" (own ship is selectable) is arranged in the Radar Simulator Room.
Display Mode: Relative Motion North-up and Heading-up.

5. PERFORMANCE SPECIFICATIONS

5.1 Own Ship Parameters

5.1.1	Maximum Speed Ahead:	Programmable up to 99.9 knots in 0.1 knot steps
5.1.2	Maximum Speed Astern :	Programmable up to 99.9 knots in 0.1 knot steps.
5.1.3	Course Setting	
	.1 Automatic	0-360° continuously by course setter
	.2 Manual	35° port to 35° starboard by steering wheel
5.1.4	Helm Inertia:	Simulated realistically representing delay between application of helm and commencement of turn.
5.1.5	Rate of Turn:	Reduced with lower values of speed and rudder angle. Maximum rate of turn is 120° per minute.
5.1.6	Speed Inertia:	Simulated realistically representing acceleration and deceleration rates of relevant own ship types.
5.1.7	Loss of Speed during Turn:	Simulated realistically for the respective own ship types.
5.1.8	Shadow Sectors	
	.1 Number of Shadow Sectors	Up to 4 for each own ship
	.2 Sector Angle:	0-90° in 1° steps
	.3 Direction of Shadow Sectors:	0-359° in 1° steps

5.2 TargetShip Parameters

5.2.1	Speed Setting :	0-99.9 knots in 0.1 knot steps
5.2.2	Course Setting:	0-359° in 1° steps
5.2.3	Detection Range:	Compatible with own ship's simulated antenna height.
5.2.4	Initial Position:	Can be set in 0.01 n.m. steps relative to the center of playing area.
5.2.5	Time of Entry:	Can be set in minutes and seconds for each target ship
5.2.6	Waypoints:	Up to 13 waypoints with speed/course changes programmable for each target ship

5.3 Coastline Generator

5.3.1 Playing Area Sizes: 200 x 200, 100 x 50 x, 25 x 25 or 10 x 10 n.miles; coastline generation area at least 20 n.mile radius for each own ship

5.3.2 Bearing Accuracy: $\pm$ 0.1° at maximum range of playing area

5.3.3 Range Accuracy:

Playing Area	Range Accuracy
200 x 200 n.m	$\pm$ 200 yards
100 x 100 n.m.	$\pm$ 100 yards
50 x 50 n.m.	$\pm$ 50 yards
25 x 25 n.m.	$\pm$ 25 yards
10 x 10 n.m.	$\pm$ 10 yards

5.3.4 Buoys and Navigation Marks: Up to 400 numbers of buoy and navigation marks can be simulated

5.4 Radar Displays

5.4.1 Display: PPI on 16" CRT

5.4.2 Range Scales and Fixed Range Ring Intervals:

Range: 0.75, 1.5, 3, 6, 12, 24, 48 n.m.

Ring : 0.25, 0.25, 0.5, 1, 2, 4, 8.nm.

(Additional range scales may be provided.)

5.4.3 Minimum Range: 25 m or less on 0.75 n.m/ range

5.4.4 Range Discrimination: 25 m or less on 0.75 n.m. range

5.4.5 Bearing Discrimination: 1.5° or better

5.4.6 Range Measurement Accuracy: Fixed range ring: 0.2% of range in use. VRM: 0.5% of range in use or 10 m, whichever is the greater.

5.4.7 Bearing Measurement Accuracy: 1° (Readout resolution 0.1°)

5.4.8 Offcenter: 70% in all directions

5.4.9 Presentation Modes: Relative motion head-up, north up course-up and True motion.

5.4.10 Variable Range Markers: 1st and 2nd VRMs

5.4.11 Electronic Bearing Line: Provided

5.4.12 Antenna Revolution: Can be preset between 20-26 rpm

5.4.13 Horizontal Beamwidth: Can be preset between 0.8-1.5°

5.4.14 Pulselength and Repetition Rate:

Range (n.m.)	Pulselength (us)	P.R.R. (Hz)
0.75	0.08	2400
1.5	0.08	2400
3	0.3	1400
6/12/24	0.6	1200
48	1.2	600

5.5 ARPA Displays

5.5.1 Configuration: A stand-alone ARPA display, not being an add-on unit to the own ship radar display, is provided at each own ship position.

5.5.2 Display: PPI on 16" CRT

5.5.3 Range Scales and Fixed Range Ring Intervals:
Ranges: 1.5, 3, 6, 12, 24, 48 n.m/
Ring : 0.25, 0.5, 1, 2, 4, 8 n.m.
(Acquisition/Tracking Range 0.2-32 n.m.)

5.5.4 Minimum Range: Not less than that of master radar

5.5.5 Range Discrimination: Not inferior to master radar.

5.5.6 Bearing Discrimination: Not inferior to master radar

5.5.7 Range Measurement: Fixed range ring: 0.2% of range in use.
Accuracy: VRM: 0.5% of range in use or 10 m, whichever is the greater.

5.5.8 Bearing Measurement: 1^{o} (Readout resolution 0.1^{o}).

5.5.59 Offcenter: 70% in all directions

5.5.10 Presentation Modes: Relative motion head-up, north-up, course-up and True motion north-up

5.5.11 Variable Range Markers: 1st and 2nd VRMs

5.5.12 Electronic Bearing Line: Provided

5.5.13 Target Acquisition
.1 Mode: Manual (10 targets) and automatic (20 targets) in selected area
.2 Suppression Area: To prevent land masses and seacletter from being detected as targets.

5.5.14
.1 Mode: 20 targets to be automatically acquired and 10 targets manually acquired.

	.2 Tracking Range:	0.2 to 32 n.m.
	.3 Cancellation:	Individual or all targets
	.4 Vector Mode:	True or Relative, 1 to 60 minutes in steps of 1 min.
	.5 Past Positions:	4 equally time-spaced positions of any targets being tracked
5.5.15	Collision Warning:	Audible and visual alarms for targets violating the preset CPA, TCPA CPA; 0-9.9 n.m. in 0.1 n.m. steps TCPA: 0-9.9 minutes in 1 min. steps.
5.5.16	Guard ring:	A guard ring can be set between 0.5 and 32 n.m. Any targets crossing the guard ring releases audible and visual alarms to let the operator prepare for an adequate maneuver.
5.5.17	Alarms:	Audible and visual alarms for dangerous targets coming into the preset collision warning area in terms of CPA and TCPA. Visual alarm for lost targets, system saturation, wrong operational sequence.
5.5.18	Trial Maneuver:	To simulate the effect on all tracked targets of an own ship manoeuvre without interrupting the update of target information. Operator can change course and speed for simulation.
5.5.19	Target Data Display:	A seperate alpha-numeric display of target data is provided.
5.5.20	Self-Diagnostic:	Provided for easy selection of the Printed Circuit Board which is liable to be in error (at off-line mode).

5.6	Simulating Accuracy	
5.6.1	Target Positioning Accuracy:	± 0.1 n.m. in northing and easting as indicated. Computation accuracy 0.01 n.m. or better
5.6.2	Own Ship Course Accuracy:	$\pm 1^{o}$ or better as indicated
5.6.3	Own Ship Speed Accuracy:	±0.25 knots or ±2% of speed set, whichever is the greater, as indicated
5.6.4	Target Ship Course Accuracy:	$\pm 1^{o}$ or better as indicated
5.6.5	Target Ship Speed Accuracy:	±0.25 knots or ±2% of the maximum speed, whichever is the greater, as indicated

EXERCISES AREAS OF RADAR SIMULATOR

Exercise Area	Admiralty Chart No.	Simulated Area	Q'ty of Chart
1. Malleca Strait	No. 3947 Melaka to Iyu Kecil	$2^{o}14'N - 1^{o}24'N$ $101^{o}44'E-102^{o}34E$ 50 x 50 n.m.	20
2. Dover Strait	No. 1892 Dover Strait-western part	$55^{o}55'N - 51^{o}45'N$ $1^{o}05'E - 2^{o}20'E$ 50 x 50 n.m.	10
3. Hormuz Strait	No. 3956 Hormuz Strait	$26^{o}08'N - 26^{o}33'N$ $56^{o}04' - 56^{o}32'E$ 25 x 25 n.m.	20
4. Osaka Bay	No. 3614 Approches to Kobe and Oasaka including Akashi Kaikyo	$34^{o}20'N - 34^{o}45'N$ $135^{o}00'E - 135^{o}25'E$ 25 x 25 n.m.	20
5. Kurushima Strait	No. 3604 Kurushima Strait	$35^{o}55'N - 34^{o}20'N$ $132^{o}50'E - 133^{o}20'E$ 25 x 25 n.m.	20
	or		
6. Bisan-Seto	No. 3605 & 3606 Bisan-Seto and Bingo Nada	$34^{o}15'N - 34^{o}40'N$ $132^{o}50'E - 133^{o}20'E$ 25 x 25 n.m.	Each 10

CONDUCT OF EXERCISES

5. Conduct of exercises

5.1 On completion of the first stage of the course, the officer in command of own ship must be allowed to use the techniques he desires in planning the intended passage, in obtaining radar and navigational information and in maneuvering his ship.

5.2 Discussions should be held among all the students following every exercises to analyzed and criticise actions taken. Records of the exercise should be available for this purpose. Discussions may be followed by demonstrations of the effects of any alternative action which could have been taken or which was suggested in discussion. On occasion it may also be beneficial to demonstrate and compare alternative types of display presentations.

6. Exercises

Stage I - Collision Avoidance Exercises

Theme -Open water exercises involving encounters with one or two target ships and progressing to multi-ship encounters.

The initial exercises should introduce the student to the equipment and update his knowledge of the use of a radar set for collision avoidance employing radar techniques.

Objective 1. To refresh the trainees' plotting and interpretation abilities and to increase his appreciation of plotting limitations and errors.

2. To recognise, where action is necessary, the need for making substantial alteration of course and/or speed at an early stage in the encounter.

3. To recognise the possibility of cancelling actions being taken, particularly when bearings are initially changing slowly.

Outline of Exercises

The exercises should include examples of all categories of realistic encounters which may call for alterations in own ship course and/or speed. It is important during this stage that exercises and demonstrations highlight those situations which have occured in actual collision cases.

Stage 2 - Navigation and collision avoidance

Theme - Exercises involving multi-ship encounters when approaching

a coastline or other navigational hazard from open waters.

Objectives - To continue practice of collision avoidance manoeuvers involving single and multi-ship encouters and at the same time

1. enhance the students' ability to work as part of a team when making landfall and navigating in coastal waters;
2. illustrate the need to ascertain position of own ship and to monitor its progress into coastal waters.
3. test each teams ability to monitor the ships track in coastal waters and maintain an efficient radar watch.

Outline of Exercises

The xercise should cover the following points:

1. Position fixing using radar and electronic aids to navigation.
2. The production and execution of a navigational plan for landfall.
3. Monitoring of ships' track in coastal waters, including use of parallel index techniques.
4. The effects on track-keeping of tidal streams, currents and wind.
5. The problems of interpreting ground stabilized true motion radar displays.
6. Collision avoidance manoeuvers
7. The occasional malfunction of equipment used in navigation and collision avoidance.

Stage 3 - Search and rescue

Theme - Exercises in either open or coastal waters involving the need to conduct a search and rescue operation while continuing practice in collision avoidance and navigational techniques and procedures.

Objectives - 1. To practice, both in-ship and inter-ship, search and rescue procedures and techniques, emphasising the need for the search to be coordinated and planned to carry out a rescue in the minimum time using to maximum effect the resources available.

2. To enhance the concept of effective bridge teamwork procedures.

Outline of Exercises

The casualty should be realistically controlled by the instructor and may, for instance, sink before rescue ships arrive on the scene. Each own ship, together with instructor controlled targets (including helecopters), should be involved in the response to the distress.

Exercises should include:

1. Navigation and anti-collision considerations.
2. The need for the casualty to assist location by others.
3. Use of D/F for homing (this facility should be used to enhance the realism of the exercise)
4. Co-ordination and planning of the search and rescue.

Stage 4 - Navigation and collision avoidance

Theme - Intensive exercises involving the approaches to and passage through areas of heavy traffic with navigational restrictions.

Objectives - To consolidate correct passage planning and watch keeping procedures required for effective navigation control in confined waters with heavy traffic.

Outline of Exercises

The exercises should stretch the ability of individuals and teams to the realistic maximum. They should include as many aspects as possible of navigation and collision avoidance.

Points covered in stages 1 and 2 should be introduced as appropriate and the exercises should also include the following:

1) The production and execution of a passage plan through an area containing focal points for traffic and traffic separation zones. Shore based traffic information should be included.
2) Approach to pilot station and pilot embarkation.

At least one exercise should be of sufficient duration to enable realistic handovers to be effected between members of the team as appropriate to prevailing circumstances, e.g. the onset of restricted visibility.

(7) 各コース開講スケジュール(案)

Year 1986

Course \ Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remark	
Nav. 3/0							←→	←→	←→	←→	←→	協議(変更)	15W×2	①
Nav. 2/0							←→	←→	←→	←→	←→		〃	②
Nav. C/0													〃	
Nav. Capt													〃	
													Xマス時期につき1か月繰り下げる	
Eng. 4/E							←→	←→	←→	←→	←→		〃	③
Eng. 3/E							←→	←→	←→	←→	←→	(協議変更)	〃	④
Eng. 2/E													〃	
Eng. C/E													〃	
Eng. R. Obs.							←→	←→	←→	←→	←→	←→	2W×12	⑤
Eng. R. Simu							←→	←→	←→	←→	←→		1W×24 (1 Room)	
Special T. Safety				←〔Poster〕	<Opening>	←→	←→		←- - -	- - -	←→		5W×4	⑥
Special Dang. C.					△訓練生募集			←→		←→			1W×24 (1 Room)	
Special Ship Mach													1W×24	⑦
Special Fuie Fight						⇨							1W×24 (1 Room)	
Special T.S.Filip.			<Receive> 〔Pamphlet〕 △広報費		<Symposium> ←- - - →※ △技術交換費		<Opening> ←〔Booklets〕for Students ←〔Plantation〕for wind breakers	△数材印刷費			<PR. to all MM School> ←〔Booklets〕 △数材印刷		※ マニラ～タフロバン 航空賃 ¥1,000 滞在費 ¥2,000 小 計 ¥3,000 ÷5万円×10人 ÷50万円	
Special MM Acad.							△応急対策費 △開講記念植樹+Air Hygrometer×5 ◎16㎜ Movie Projector							
Special MM School							△日本語 Tape			〔教育機材〕500万円→		Encyolopedia		
Special Expert	〔教育機材〕500万円→ BUS VTR L×1 C×1 N×2 E×1 〔携行機材〕@30×5=150万円 〔医薬品〕			N×1 E×1 〔携行機材〕@30×2=60万円			井上式定規×10 ○O.H.P @20万×2(N.E)+Copier △Tape R.@10万×2(N.E) ○Books		Divider×10			万能工作機 溶接機 O.H.P×2 Slide Projector×1	(欄外数字○は,「累計必要教室数」を示す。)	

Year 1987

Course \ Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remark	
Nav. 3/0				←	—	—	→		←	—	—	→	15W×2	
Nav. 2/0							←	—	—	→			〃	⑧
Nav. C/0	←	—	—	→			←	—	—	→			〃	
Eng. Capt	←	—	—	→			←	—	—	→			〃	⑨
Eng. 4/E				←	—	—	→		←	—	—	→	〃	
Eng. 3/E							←	—	—	→			〃	⑩
Eng. 2/E	←	—	—	→			←	—	—	→			〃	
Eng. C/E	←	—	—	→			←	—	—	→			〃	⑪
R.Obs.	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔		2W×12	
R.Simu.	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	1W×24	
T.Safety		←	—	→	←	—	→	←	—	→	←	—	5W×4	
Dang.C.			←	—	→		←	—	→		←	—	1W×24	
ShipMach.	⇨												1W×24	
Fire Fight	⇨												1W×24	
Special T.S.Filip						<Evaluation> → Reeducation to M.M. Instructor								
M.M Acad						<Symposium> with M.M. Instructor								
M.M School						← — →								
										〔教育機材〕	500万円→			
Expert											Slide Projector×1			
											Rescue boat			
												◎交代		

Year 1988

Course \ Month		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remark
Nav.	3/0	←	—	—	—	—	—	—			→	—	—	15W×2
	2/0	→	—	—	—	—	—	←	—	—	—	→		〃
	C/0	←	—	—	—	—	—	—			→	—	—	〃
	Capt	→	—	—	—	—	—	←	—	—	—	→		〃
Eng.	4/E	←	—	—	—	—	—	—			→	—	—	〃
	3/E	→	—	—	—	—	—	←	—	—	—	→		〃
	2/E	←	—	—	—	—	—	—			→	—	—	〃
	C/E	→	—	—	—	—	—	←	—	—	—	→		〃
	R.Obs.	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔		2W×12
	R.Simu.		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	1W×24
	T.Safety		←	—	→	←	—	→	←	—	→	←	—	5W×4
	Dang.C.			←	—	—	→	←	—	—	→			1W×24
	ShipMach.	⇨												1W×24
	Fire Fight	⇨												1W×24
Special	T.S.Filip.						Summer Vacation	<Reeducation to Instructor>						
	M.M.Acad.							←	—	—	→			
	M.M School							←	—	—	→			
	Expert										〔教育機材〕500万円→			

Year 1989

Course \ Month		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remark
Nav.	3/0	→			←			→						15W×2
	2/0	←				→								〃
	C/0	→			←			→						〃
	Capf	←				→								〃
Eng.	4/E	→			←			→						〃
	3/E	←				→								〃
	2/E	→			←			→						〃
	C/E	←				→								〃
	R. Obs.	↔	↔	↔	↔	↔	↔	↔						2W×12
	R. Simu.	↔	↔	↔	↔	↔	↔	↔						1W×24
	T. Safety		↔	↔		↔	↔							5W×4
	Dang. C.	↔		↔			↔	↔						1W×24
	Ship Mach.													1W×24
	Fire Fight													1W×24
Special	T. S. Filip.						<Evaluation> ↔	<Reeducation to Instructor> →						
	M. M. Acad						↔							
	M. M School						↔							
	Expert