

## Maritime Training

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### 13.1 Organization and Responsibility

**a.** The Maritime Training and Development Unit, (SIDMAR), a unit of the ACP Vice Presidency for Human Resources, is tasked with administering the Pilot Understudy Program (PUP), the Pilot-in-Training Program (PIT), the Towboat Training Program (mate trainee and mate levels), the Port Entry Coordinator Program (PEC) and the Limited Pilot Program. The Maritime Training Unit also conducts a variety of additional maritime short-term programs for personnel from other Authority units. Some of these are specifically designed cross-training programs for Panama Canal pilots and towboat masters and their counterparts working for the Panama Maritime Authority, and for other private shipping and port industry personnel. The same types of programs are conducted for, among others, small craft operators, Transit Advisors, dredge mates and deckhand leaders. In addition, License renewals for Pilots and Tug Masters as well for all personnel on ACP floating equipment. In addition training is provided to personnel of

other Government and private organizations; orientation and training is provided every year to cadets of the Panama Nautical School, Columbus University, including other nautical academies from around the world and local Maritime Training Centers.

**b.** The Maritime Training Unit administers training for the maritime work force in the section's marine simulator. Ship handling simulator, Ship Manned Model Training and Engine Room Simulator training enhances hands-on training and increases the trainees' exposure to many types of Canal operations, emergency response exercises, and recreation of accidents that have taken place in the Canal. Ship handling simulator training and Ship Manned Model Training is, undoubtedly, the safest environment in which pilot trainees can learn and develop new skills and techniques.

**c.** The Maritime Training Unit's training staff is composed of:

- (1) The supervisor, Maritime Training Unit;
- (2) The Simulator Programs Coordinator; (Pilot training coordinator);
- (3) A Seamanship & Floating Equipment Training Coordinator;
- (4) A Special Maritime Programs Coordinator; (Pilot Training Officer);
- (5) A Seamanship & Floating Equipment Instructor
- (6) Three Computer Specialists, who are responsible for the various computer training instruction courses, the ship-handling simulator and data base design.

**NOTE:** The entire training staff teaches, designs courses and provides consulting services to ACP operational units. In addition, subject-matter experts from the ACP also provide training support, sharing their expertise with the trainees.

## 13.2 Towboat Training Program

**a.** Applicants for the Mate Trainee Program must meet the following requirements:

- (1) Must be a graduate of a certified nautical academy, or
- (2) Must possess experience and training considered equivalent to the above requirement by a review board;
- (3) Must hold a valid oceangoing officer's license; and
- (4) Must have a working knowledge of the English language, have no physical impairments and know how to swim.

**b.** Promotion is not automatic. Trainees must acquire while in the program a thorough knowledge of the Canal area; understanding of the theoretical principles of tugs' propulsion systems and hydrodynamics of ship design, and the ability to apply these concepts to practice. Trainees must develop a high degree of command presence, situational awareness, decision-making, leadership, and effective communication skills.

- c.** To graduate from this program and to qualify for a Towboat Master License, the trainee must complete comprehensive program criteria which may take over two years to complete. The first phase of this program is mate trainee. At the beginning, trainees will participate in an orientation program, at the end of which they will present a thesis-like project.
- d.** Throughout the program, mate trainees are required to attend specially designed workshops at the Maritime Training Unit which range from hawser towing to escorting submarines through the Canal. Some workshops are dedicated exclusively to discuss accidents involving towboats which have taken place in Canal waters. Mate trainees are administered periodic written exams on the subjects covered in these workshops. Other training workshops, conducted by other Authority units, include CPR, first aid, firefighting, defensive driving, radar, among others.
- e.** Mate trainees are required to complete the Criteria Notebook, which is a comprehensive set of requirements that, among other things, demands trainees to become familiar with the firefighting apparatus aboard towboats and other floating equipment. Mate trainees must stand 260 eight-hour watches on Authority Tugs under the supervision of licensed towboat masters. Throughout the training period, trainees are evaluated by the towboat master with whom they work. Additionally, this unit's training officers will conduct periodic evaluation rides to determine the trainees' progress.
- f.** Mate trainees will also work as transit advisors. During these transits, they act as advisors of transiting boats that are less than 65 feet (20 meters) in length. These jobs give them the opportunity to apply what they know of the Canal operation and local area, to develop their leadership and communication skills, as well as to strengthen their command presence.
- g.** Mate trainees with sufficient previous towboat watch-standing experience and who are considered competent in all other respects may be credited with up to 130 watches, counted towards the 260 watches required for promotion. At the end of the mate trainee phase of the program, trainees must take a written license exam which is administered by the Board of Inspectors. Upon successfully completing this, as well as a practical exam to evaluate their tug handling skills, they are promoted to the next phase: Towboat Mate.
- h.** Trainees are required to stand a minimum of 260 eight-hour watches during the mate phase of the program. Just as during the first phase of the program, trainees stand watches on both sides of the Isthmus and at the Gamboa Dredging Division headquarters; this gives them the opportunity to familiarize themselves with different areas and the respective operational requirements. At Gamboa, trainees are exposed to the special procedures and arrangements required to move dredging equipment.
- i.** While assigned to work aboard each one of the tugs in the Towboat Section fleet, trainees receive hands-on training, the most important component of their training program. During this phase of the program, mates are also required to attend

workshops – including several supervisory and leadership courses conducted by the Authority's Training Center.

**j.** The same as during the mate trainee phase of the program, training officers will conduct periodic evaluation rides to determine their progress. At the end of this phase, mates must successfully pass written examinations and a final series of practical check rides. Once this is accomplished, they are promoted to Masters of Panama Canal Authority Tugs of less than 500 gross tons.

**k.** After towboat masters complete at least 520 eight-hour watches, they are eligible to apply for the Pilot-in-Training Program.

### 13.3 Pilot Understudy Program (PUP)

**a.** The Pilot Understudy Program was developed as a third avenue to bring more individuals with maritime schooling and somewhat limited maritime experience who could be quickly qualified for the Pilot-in-Training Program.

**b.** An applicant for the Pilot Understudy Program must meet the following minimum requirements:

- (1) Must be a maritime academy graduate, and;
- (2) Must have at least two years of license experience as a Third Officer on the high seas in charge of a watch aboard vessels of more than 1,600 gross tons; or
- (3) Must have experience equivalent to the above, as determined by an Executive Vice Presidency for Operations Review Board; and
- (4) The applicant must be able to communicate effectively in the English language, have no physical impairments and know how to swim.

**c.** Throughout the program, the pilot understudy must acquire a thorough knowledge of the Canal area. He must fully comprehend the theoretical principles of ships' hydrodynamics. He must learn to apply these theoretical concepts to practice in order to cultivate the necessary ship handling skills. The pilot understudy must also mature while developing a strong command presence; a high level of effective decision-making and English communication skills. The goal of the Pilot Understudy Program is to qualify trainees for the Pilot-in-Training Program, just a step away from becoming a Panama Canal Pilot.

**d.** The Pilot Understudy Program provides trainees with the opportunity to circumvent the aging factor that is commonly associated with the experience and professional maturity necessary to tackle the uncompromising demands of the pilot's job. Another objective of the Pilot Understudy Program is to unify the trainees' wide range of professional backgrounds and to integrate them as quickly as possible to the Canal Authority's operation. This program involves trainees in a variety of activities that require a high level of self-motivation and responsibility.

**e.** This program, as is the Canal operation itself, is very dynamic, changing according to the needs of the trainees and the training opportunities available. The program criteria may be accomplished in less than 24 months, and it is divided into three distinct levels or segments: The first is dedicated to orientation activities; the second to satisfy training objectives; and the third to development.

**f.** Throughout all three program levels, Pilot Understudies are required to participate in lectures, workshop, and hands-on training at Panama Canal work areas. Through these assignments, trainees become aware of the critical relationship that exists between all Panama Canal units and the Panama Canal pilot job requirements. The most important objective of the workshops is to focus on the theoretical aspects of ships' hydrodynamics and ship handling exclusively from a pilot's point of view. Additionally, Pilot Understudies participate in workshops on engineering for deck officers, introduction to microcomputers, CPR, first aid, and firefighting.

**g.** Pilot Understudies work as transit advisors; that is, in charge of transiting boats less than 65 feet (20 meters) in length. There is no better way for them to apply what they have learned and to acquire genuine hands-on piloting experience. In close association with the Transit Operations Division, the Traffic Management Section, and other transit advisors, Pilot Understudies also inspect small boats and assist Port Captains when inspecting and establishing transit requirements for ships and dead tows.

**h.** Pilot trainees are assigned to Authority towboats. These assignments expose trainees to marine operations that directly support a vessel's transit and the job of a pilot. Trainees develop, through these assignments, their command initiative, decision-making skills, and ship handling (hydrodynamics-propulsion systems). These assignments allow them to look at the operation from the Towboat Master's perspectives.

**i.** Pilot Understudies are also assigned aboard Authority launches. By becoming familiar with their characteristics and limitations, pilots are able to better assess operational situations and maneuver their own ships safely when launches are coming alongside. This could include an agent's launch that may be bringing additional stores aboard, the launch bringing the boarding party alongside, or the launch preparing to embark or disembark the linehandlers, or the pilot.

**j.** Training aboard the unit's marine simulator is the closest to actual hands-on training to which the pilot trainees are exposed. Trainees practice their piloting skills in the simulator for a minimum of twenty 8-hour sessions throughout the program. These sessions are based on a development training criteria.

**k.** At the Admeasurement Unit, Pilot Understudies become familiar with the requirements imposed on vessels desiring to transit the Panama Canal. They become involved in all of this unit's activities, including routine boardings, inspection of required documents, establishment of admeasurement and tolls, surveillance, and establishment of dangerous cargo requirements and regulations. The importance of boarding facilities

is emphasized in all Canal operational areas and activities; however, safe boarding is specifically stressed to the trainees while in this assignment due to the frequent boardings required of the admeasurers while in the performance of their duties.

**l.** Pilot Understudies are also assigned to the Dredging Division. While standing watches on dredging equipment, they become thoroughly familiar with the different procedures and safety regulations that direct the operation and navigation of this floating equipment.

**m.** Pilot Understudies are assigned to the Fleet and Equipment Maintenance Division. This assignment will familiarize them with the process of maintaining the Authority's floating equipment. There, they learn about the synchrolift and other equipment used to alleviate or solve problems that may occur in the repair and overhaul of locks miter gates or of other vital machinery used in the Canal.

**n.** The assignment of Pilot Understudies to the Maritime Traffic and Admeasurement Section, also known as the Marine Traffic Control Unit (MTC), offers them the opportunity to learn how Canal traffic is scheduled and managed. They learn how and why important up-dated information, essential to accomplish expeditious transits, should be exchanged. They learn how ships are scheduled many hours in advance, and how pilots and tugs are assigned work. While assigned to Harbor Control, pilot trainees learn how docking and undocking operations are coordinated. They also learn many of the variables that influence scheduling of ships and other Canal resources involved, and how even small changes can affect the next day's transit schedule.

**o.** Pilot Understudies also receive training at the Locks and Installation Maintenance Division. Since the locks, in fact, make the Canal possible, future pilots must thoroughly know them. They are exposed to the operation of towing locomotives. This, in addition to classroom seminars on how the locks work, will give the future pilots a better idea of the capabilities and limitations of the locks, as well as the locomotives, and how to better utilize them.

**p.** Because of the constantly changing contours of the channel beds in the Canal, pilots should be aware of the necessity for the Topography, Hydrography and Cartography Section to take frequent soundings to ensure safe passage of transiting ships. While assigned here, Understudies learn about the causes of these changes, the effects of tides in the Canal, the buoy system, the ranges used in the Canal, and the charting methods used.

**q.** One of the biggest dangers aboard ships, and certainly one of the major causes of marine casualties in the high seas, as well as in the Canal, is fire aboard. For this reason, the Pilot Understudies attend an intensive firefighting course given locally by the Authority's Protection and Emergency Response Division in order to become thoroughly versed in fire safety precautions and emergency reaction.

**r.** The Transit Operations Division is responsible for the administrative functions and controls of the Canal operation. These functions are carried out by the Canal Port

Captains. While assigned to this office, Pilot Understudies learn how and why ship inspections are made, how a ship is approved for first-time transit through the Canal. They also learn about the relationship between the Authority and other maritime agencies and the Panama Maritime Authority. They also become aware of the complexities involved in scheduling a ship prior to arrival, how shipping agencies and the Government authorities are involved in the process, and how these will impact the ship's transit.

**s.** Pilot Understudies are assigned to the Board of Inspectors. Here, they become familiar with the investigations conducted by the Authority. These investigations determine the liabilities and responsibilities of not only the ship, but also the pilot and any Authority personnel involved in an accident. Pilot trainees also gain valuable information from past accidents, since records of past investigations are available for analysis.

**t.** Simulator training provides the opportunity to expose pilot trainees to the same ship handling experience as many times as necessary, without the danger of damage to Authority or private property. Typical Canal operations are recreated and practiced until pilot trainees become familiar with these operations and develop the necessary skills. The exercises are rerun and critiqued. If operational or ship handling mistakes are made, these are pointed out to the trainees and the exercise repeated, emphasizing the correct procedures.

**u.** Emergency situations involving transiting vessels are also recreated. These may arise at any place and at any time due to failure by the vessel's engine or steering system, or fire aboard. Panama Canal pilots have first-response and damage control responsibilities and to prepare for this, pilot trainees discuss correct pilot actions according to specific emergency situations.

**v.** Actual situations which have caused ship accidents in the Canal are also recreated. Pilot trainees participate in exercises involving similar circumstances, review the decision-making processes that took place and examine the reasons why the accident may have taken place and how it may have been avoided. Some of these incidents may be witnessed by the trainees only once in their careers. Millions of dollars in property damages and even human lives may depend on the promptness and effectiveness of the decision-making process required of the pilot.

**w.** Advanced, refresher training in the use of the radar, AIS and ECDIS is also provided in the unit's radar simulator. The tropical climate of Panama causes severe atmospheric phenomena such as heavy rains and thick fog. These are prevalent during various times of the year, and during adverse weather resulting in restricted visibility, pilots must rely on the ship's radar, AIS and ECDIS for much of his navigational information.

**x.** Throughout the program, trainees accompany pilots aboard transiting vessels for observation and hands-on training. These assignments are most important since these directly expose them to the requirements of the job. The control pilot with whom they

have worked evaluates them after every transit. Training officers also conduct periodic evaluation and training transits with them. To complement these training transits, we have implemented the Mentor and Intensive Locks Training Programs. The former allows trainees to accompany the same volunteer pilots for a period of several weeks on all of their assignments. The Intensive Locks Training Program, as the name suggests, intensifies training entering and exiting the sea and lake lock entrances. By the end of the Understudy Program, trainees are actually assigned to an average of 75 transits each, have worked with the hundreds of employees who make ships' transits possible, and have been exposed to every operational activity in the Canal.

y. To graduate from the program and be promoted to Pilot-in-Training, Pilot Understudies must complete the program's requirements. They must pass a series of written and oral examinations, on each level and a practical evaluation in the Canal. They are also required to complete a comprehensive project, most of it during their first training level. This is the Criteria Notebook, and completing it will occupy most of the trainees' free time. Among other requirements, this criteria project requires trainees to inspect and photograph Panama Canal equipment such as launches, dredges, drill boats and cranes, towboats and onboard firefighting equipment. Additionally, Pilot Understudies are required to present a graduation project. This is one of the most productive requirements of the program. Some examples of projects submitted to date by trainees are: Ship Handling Operations in the Panama Canal, Panama Canal Standard Phraseology, Pilot Emergency Response, Ship Classification in the Panama Canal, Dry Dock Protocol, and a video describing the Authority's maritime training programs.

## 13.4 Pilot Training Program (PIT)

a. All applicants to the position of Panama Canal pilot must successfully graduate from the Pilot-in-Training Program (PIT). An applicant to the PIT Program may qualify and be selected via three avenues, and must meet the following minimum qualification requirements:

- (1) Must be a graduate of a certified maritime academy; and
- (2) Must have at least three years' experience as a watch-standing officer;
- (3) For at least one of those years, he must have worked as a Chief Mate (First Officer); and
- (4) Must hold a Chief Mate License (of oceangoing vessels more than 1,600 gross tons); or
- (5) Have graduated from the Pilot Understudy Program; or
- (6) Have stood a minimum of 520 eight-hour watches as a Panama Canal Authority towboat master FE-15, FE-16 and FE-17; and
- (7) Must be able to communicate effectively in the English language.

- b.** Pilots-in-training receive preparatory courses and participate in workshops similar to those given to Pilot Understudies and trainees in the Towboat Program. Once they enter the program, they immediately begin making frequent training transits with qualified pilots.
- c.** The Pilot Training Program (PIT) is divided into two distinct phases: The Pilot-In-Training (CP2) and the limited pilot phases (CP3). During the first phase, trainees are almost exclusively dedicated to ride with qualified pilots for hands-on training aboard transiting vessels. The second phase of the program begins once trainees have obtained their first license: Pilot, Panama Canal, of Vessels Not Over 225 feet (68.6 meters) in length.
- d.** From this point on, pilot trainees follow comprehensive and strict promotion criteria that include time and number of transit assignments per level. For promotion, trainees must also successfully complete oral and written exams, practical evaluation in the Canal, other assignments to Canal operational units, and participation in simulator sessions and workshops.
- e.** Once the corresponding promotion requirements, per level, are successfully met, pilot trainees will continue to be promoted through the following qualification levels: Pilots, Limited to 400 feet (121.9 meters), Limited to 460 feet (140.2 meters), Limited to 500 feet (152.4meters), and Limited to 526 feet (160.3 meters).
- f.** The pilot-in-training level lasts a minimum of 22 weeks. PIT's must make a minimum of 40 transits under the tutelage of qualified pilots. After participating in several workshops and simulator sessions, PITs will be examined by the Board of Inspectors on subjects such as Rules of the Road, radar, ship handling, naval architecture, tides, boarding and stability. Upon completion of these exams, they must pass a practical exam in the Canal. A Maritime Training Unit officer or a designated Canal Port Captain administers this exam. At the end of this stage, and after successfully meeting all requirements, PITs are licensed as pilots, Panama Canal, of Vessels Not Over 225 feet (68.68 meters).
- g.** Once certified as Pilots, Limited to 225 feet (68.6 meters), they still continue to accompany qualified pilots aboard ships; however, they will be qualified to make "solo" transits on ships less than 225 feet (68.6 meters) in length. After a minimum of 14 weeks at this level and 30 transits, they are given another check ride to test their ship handling abilities. Upon successfully passing this practical exam, they will be certified and licensed as Pilots, Panama Canal, of Vessels Not Over 526 feet (160.3 meters) in length.
- h.** Even though they hold this license, limited pilots will still be restricted to the size of vessels to which they may be assigned as control pilots. Their first limitation is to vessels not over 400 feet (121.9 meters) in length. Once they reach this level, limited pilots are placed on the normal pilot rotation schedule and assigned accordingly. They also continue to attend lectures, participate in workshops, and simulator training sessions. During this stage, which lasts six weeks, limited pilots must work as control

pilots aboard at least ten transiting ships. Upon successfully passing a practical exam aboard a transiting vessel, limited pilots are promoted to the next level, Pilot, Panama Canal, of Vessel Not Over 460 feet (140.2 meters).

**i.** Pilots Limited to 400 feet (121.9 meters) must complete a minimum of 16 weeks and 40 transits, and pass a practical exam to be promoted to the next level: Pilots, Limited to Vessels of Less than 500 feet (152.4 meters). To complete the requirements of this level, Limited pilots must work for a minimum of 16 weeks aboard at least 40 transiting vessels, and must pass another check ride. After fulfilling these requirements, they are promoted to the fourth and last level, lasting a minimum of 16 weeks and requiring a minimum of 40 transits on vessels less than 526 feet (160.3 meters) in length, having a tropical displacement of not more than 20,000 tons. Upon successfully passing his/her last check ride, limited pilots will finally reach the level for which they have been training: Pilot, Panama Canal, of Vessels of Any Tonnage, CP-4, Step-1 Pilot.

**j.** Throughout the program, if trainees experience problems, remedial training is provided through special assignments. Limited pilots must assume reasonable responsibility for assuring they are receiving effective and appropriate training assignments. Before being promoted to Qualified Pilot, (CP4) Step-1, they will receive theoretical and practical training as assisting Pilots on vessels that require a pilot on the forward or aft station. Also, they have the opportunity to be specially assigned to a job or operation with which they want to become familiar, before required to be in charge and responsible for the outcome themselves. These assignments include transits aboard car carriers, tankers; multiple Pilot vessels; and one pilot, six-locomotive, twelve-wire vessels.

**k.** Once limited pilots reach (CP4) the Step-1 level, they leave the Maritime Training Unit and join the Pilot Rotation and Scheduling Unit. While gaining more experience and demonstrating their ability as ship handlers, pilots progress to the Step 11 level. They are still restricted to specific ship sizes and displacements at every level, however. They will reach the final step, CP-4, Step 11, after ten years. As Step 11 pilots, they will be qualified for any ship transiting the Canal, except for special cases in which they must observe the operation before qualifying as control pilots, as in the case of nuclear and Trident submarines. This might be requested at Step-8 level.

## 13.5 Limited and Qualified Pilots Upgrading

**a.** The ACP, through the Maritime Training Unit, agrees to assist the Limited and Qualified Pilots in maintaining or enhancing their professional qualifications as stipulated by International Maritime Organization (IMO) standards and the International Convention on Standards of Training, Certification and Watch-keeping for Seafarers (STCW).

- b.** Upgrading and fine-tuning the skills of limited and qualified pilots who return to a classroom environment to participate in seminars and lectures which emphasize the theory of ship handling and other subjects related to the maritime field and in refresher courses on the ship handling simulator.
- c.** Specialized ship handling training will be given to pilots in grade CP-04-09, which includes training at the Ship Manned Model Training Center and may include the use of facilities outside the ACP.
- d.** Coordinating the training of pilots in full-bridge simulator sessions at facilities located around the world. This type of training is considered the most practical and effective method of complementing the on-the-job training that pilots and trainees alike receive in the Canal.
- e.** Tuition for training courses authorized by the Employer in accordance with the Tuition Refund Training Program shall be reimbursed to the member after he/she successfully completes the training.
- f.** Remedial training shall be tailored to correct or improve a pilot's performance in accordance with the recommendations of a Review Board.

## 13.6 Additional Programs

The Maritime Training Unit is also responsible for directing, coordinating and designing additional programs that respond to new and growing personnel training requirements, such as:

- a.** Upgrading and fine-tuning the skills of limited and qualified pilots who return to a classroom environment to participate in seminars and lectures which emphasize the theory of ship handling and other subjects related to the maritime field and in refresher courses on the ship handling simulator (SIDMAR).
- b.** Coordinating the training of pilots in full-bridge simulator sessions at facilities located around the world. This type of training is considered the most practical and effective method of complementing the on-the-job training that pilots and trainees receive in the Canal.
- c.** Providing supplemental training to enhance and strengthen the expertise of experienced maritime personnel, including the advanced motorboat operator's course for Dredging and Transit Operations Divisions, basic radar training for high-speed motorboat operators, and workshops for the Dredging Division Apprentice Program.
- d.** Providing orientation and training programs for Panama Government personnel, maritime institutions and U.S. agencies and others that require basic knowledge of Canal operations.

- e.** Coordinating the yearly Orientation and Training Program for the Panama Nautical School and other maritime academy cadets for, which offers a first-hand view of Canal operations.
- f.** Administering training programs designed to stimulate the interest of the trainees and full participation in the Authority's maritime management field.
- g.** Organization of congresses, courses, seminars, forums and technical events regarding the maritime industry and related matters.
- h.** Consulting and counseling on design, planning, organization and evaluation of maritime projects.
- i.** Building of new data base in the simulator for research and training. Research is conducted for new projects in order to anticipate problems. In the conceptual design phase, simulation is a tool in the decision making progress to determine whether a concept is operationally feasible and efficient. In addition, aids to navigation such as ranges, types of buoys, lights, docking maneuvers, etc. can be tested by using towboats to obtain conclusions in support of the project.
- j.** Facilitating training, for pilots and ship masters from other countries, at the ACP Ship Manned Model Training Facility.