**DEPARTMENT OF THE NAVY**
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY TO

NAVSEAINST 5400.55H
Ser 00ZP/063
29 Aug 05

NAVSEA INSTRUCTION 5400.55H

From:   Commander, Naval Sea Systems Command

Subj:   ENGINEERING DUTY TRAINING AND QUALIFICATION PROGRAM

Ref:    (a) Naval Military Personnel Manual Article 1212-010
        (b) NAVSEAINST 5400.56D
        (c) NAVSEAINST 3540.04
        (d) SECNAVINST 5300.36

Encl:   (1) Graduate Education Curricula Approved for
            Engineering Duty Officers
        (2) Description of Core Courses
        (3) EDQP Phases
        (4) Sample Guidance Letter
        (5) Oral Examination Guidance
        (6) Sample Oral Examination Announcement Letter
        (7) Sample format for EDQP Completion Letter
        (8) Lean Rapid Improvement Event Guidance
        (9) Lean Manufacturing and Quality Training Standards

1.  Purpose.  This instruction describes the training
program for Engineering Duty Officers (EDs) and the
Engineering Duty Qualification Program (EDQP).  The
provisions of this revision are mandatory for all EDs
commencing Experience Tours on or after 1 November 2005.
EDs commencing Experience Tours prior to 1 November 2005 may
continue to qualify using the provisions of the previous
revision to this instruction or, with the express written
consent of their Certifying Officer, apply in their
entirety, the provisions of this revision.

2.  Cancellation.  NAVSEAINST 5400.55G of 21 June 02.

3.  Background.  In January 1989, the Chief of Naval Operations
designated the Commander, Naval Sea Systems Command (COMNAVSEA)
as the single designator advisor for the ED community.  Although
there are exceptions, officers typically enter the Community as
warfare qualified Lieutenants or Lieutenant Commanders with
substantial experience at sea.  The ED Community comprises a
highly educated Restricted Line community particularly trained to
address complex technical issues and fill positions of
responsibility and leadership within the Navy's Acquisition
Workforce.  Each officer either has obtained, or will obtain, an
advanced degree in one of several approved technical specialties,
which are listed in enclosure (1).  All EDs receive general
("core") and specialized training throughout their careers.

Officers are assigned the 146X designator upon entering the Community and the 144X designation upon completion of the qualification program described herein. Reference (a) provides additional information concerning entry into the ED Community.


4. Discussion

   a. Formal Engineering Duty Officer Training. Throughout his or her career, each ED will be required to complete certain training. This training is characterized as either "core" or "specialized."

      (1) Core training is required of all EDs and consists of the Basic and Senior Courses, which are taught at the Engineering Duty Officer (EDO) School, Lean Manufacturing and Quality training, the Advanced Management Program (AMP), an introduction to supervision of civilian personnel, and a seminar for newly selected Captains. Core courses are designed to give each ED the fundamental tools required to perform effectively. This training is briefly described in enclosure (2).

      (2) The training continuum for EDs does not end with completion of the EDQP. It should include specialized courses that provide job-specific or individual-specific training. The objective of specialized training is to provide each ED with specific knowledge and/or skills required by a particular billet or career specialty area. Due to the broad spectrum of technical disciplines encompassed by naval engineering and the increasing demand for expertise in business and financial management, several types of specialized training are required. Representative examples of specialized training are Diving and Salvage School, Institute of Industrial Engineering courses, Professional Summer at the Massachusetts Institute of Technology (MIT) and, the Defense Acquisition University. Commands are encouraged to budget for and support mid-career training opportunities for qualified EDs, including pursuit of Professional Engineer's licenses and advanced degrees in business management.

      (3) The Navy Corporate Business Course (NCBC) may also be offered to select ED Captains. The overall goal of this executive level course is to further develop business skills to make leaders better prepared to undertake change initiatives. The NCBC objectives are to motivate captains to improve how their organization does business, to provide the capability to critically analyze mission in a rapidly changing environment, and to develop and implement a plan to execute the strategy while achieving enhanced effectiveness and efficiency. NCBC is centrally managed by the Navy's Executive Learning Office.

(4) Additional graduate-level educational opportunities are also available.  Examples include one to two year programs at the National War College and at the Industrial College of the Armed Forces (ICAF).  Since billets and funding are limited and suitability to follow-on tours needs to be evaluated, these and other similar opportunities should be coordinated via the Senior ED Detailer.

(5) Additional graduate education is important to professional development, thus EDs are highly encouraged to take advantage of opportunities to obtain additional graduate level education either on their own or other means.

(6) The Commanding Officer of the EDO School, in accordance with reference (b), has the responsibility to develop training approaches that give EDs the tools to properly discharge their responsibilities and make recommendations concerning that training to Community leaders.

b.  The Engineering Duty Qualification Program (EDQP).  The EDQP is the ED "apprentice" program.  Completing a technical Master's degree is normally the first step of the program, followed by a nominal two-year period during which officers first apply the basic tools they will need to be successful, while being observed and instructed by senior EDs.

(1) The EDQP has five purposes:

(a) To ensure that each ED completes appropriate professional education.

(b) To ensure that each ED learns the plans, programs, policies and procedures used by the Community.

(c) To encourage each ED to complete the necessary requirements for Career Field Certification in the Department of the Navy (DoN) Acquisition Workforce, and selection as a member of the Acquisition Professional Community.

(d) To provide an opportunity for senior EDs to observe and instruct each officer in an ED billet prior to assigning the 144X designator.

(e) To promote pride and professionalism in the Community by providing a common professional experience.

(2) The EDQP has five phases:

(a) The entry phase, in which qualified officers are selected for entry into the Community.

(b) The postgraduate education phase, wherein officers obtain an appropriate subspecialty code as a result of receiving a technical Master's degree in an approved discipline.

(c) The Basic Course phase, during which officers complete the Basic Course at the EDO School. The Basic Course is also certified as equivalent to ACQ 101 and ACQ 201, which are fundamental requirements for Acquisition Workforce certification under the congressionally mandated Defense Acquisition Workforce Improvement Act (DAWIA).

(d) The experience phase, during which officers achieve basic qualifications, complete on-the-job training, are observed and instructed by senior EDs, continue to acquire the education, training and professional experience required for career field certification within the DoN Acquisition Workforce, complete Lean Manufacturing and Quality training, and perform successfully for at least one year in an ED billet.

(e) The certifying phase, in which officers successfully complete an oral examination and present the documented results of a Rapid Improvement Event before being designated 144X. This phase must be completed within two years. The two-year clock starts when a candidate arrives at his ultimate command after graduating from the Basic Course or, for unusual circumstances, at a date negotiated between the Commanding Officer, EDO School and the prospective Certifying Officer.

Additional information concerning the five phases is presented in enclosure (3).

(3) In view of the requirements to complete Lean Manufacturing and Quality training, be observed by senior officers, and complete job-related training and qualifications, candidates should take full advantage of the time allowed without placing the completion requirement at undue risk. Having the oral board scheduled at the 18-20 month point is a prudent approach, allowing time for additional study and preparation in the event a second board is needed.

c. The Engineering Duty Qualification Board (EDQB). The EDQB provides oversight of the EDQP and makes recommendations concerning the EDO School curricula.

(1) The EDQB:

(a) Recommends changes to the EDQP to COMNAVSEA.

(b) Serves as the technical review body for training strategies and courses as discussed in reference (b).

(c) Approves requests for waivers, extensions, or terminations of the EDQP process.

(d) Certifies completion of the EDQP for all officers.

(2) Membership of the EDQB consists of:

(a) An ED Flag Officer appointed as Chairperson by the Senior ED (usually NAVSEA Deputy Commander for Ship Design, Integration, and Engineering (SEA05)).

(b) An ED Flag Officer from the Space and Naval Warfare Systems Command (SPAWARSYSCOM).

(c) The Commanding Officer of the EDO School.

(d) An ED Captain appointed by Director, Strategic Systems Program, or by the Senior ED.

(e) An ED Captain serving as a program manager (appointed by the Chairperson).

(f) An ED Captain combat systems specialist (appointed by the Chairperson).

(g) The senior ED Detailer (PERS 445).

(h) The Executive Director of the EDO School.

(i) The Director, ED Officer Plans and Policies (SEA 00ZP).

(j) Other members appointed by the Chairperson.

5. Applicability. This instruction applies to all active duty Engineering Duty Officers who enter the community via the lateral transfer or ED option process with the exception of those in the Naval Nuclear Propulsion Program who shall be governed by the provisions of reference (c). The provisions of this instruction also govern the small numbers of officers who enter the Community through direct commissioning however, they will normally qualify during their second ED tour. Exceptions to this policy must be approved by the EDQB.

6. Exceptions. In extraordinary cases, exceptions to the provisions of this instruction may be requested for officers in the grade of commander (e.g., waiving the experience phase one-year minimum time requirement). The Certifying Officer should submit waiver requests, including a proposed training and qualification program, to the Chairperson of the EDQB via the Director, ED Plans and Policies, with a copy provided to the

Commanding Officer of the EDO School. The EDQB Chairperson must approve all requests for waivers to the provisions of this instruction.

7. Responsibilities

    a. Designator Advisor (COMNAVSEA)

        (1) Establish the requirements of the EDQP.

        (2) Qualify officers completing the EDQP.

    b. Senior Engineering Duty Officer

        (1) Appoint the Chairperson of the EDQB.

    c. Chairperson, EDQB

        (1) Oversee the activities of the EDQB.

        (2) Call special meetings, as required.

    d. Director, Engineering Duty Officer Plans and Policies (NAVSEA 00ZP)

        (1) Advise the EDQB on personnel matters.

        (2) Advise each newly selected ED, and each prospective ED, of the requirement to complete the EDQP prior to being designated as an Engineering Duty Officer, 144X.

        (3) Review each EDQP completion letter and prepare the qualification letter for the signature of the Designator Advisor, COMNAVSEA, and the certificate for the signature of the Chairperson of the EDQB.

        (4) Conduct the annual seminar for newly selected Captains.

        (5) As required, initiate Memoranda of Understanding (MOUs) with non-NAVSEA commands at which EDs serve. MOUs will address the administration and funding of the EDQP and other issues that pertain to the program.

    e. Senior ED Detailer (PERS 445)

        (1) Ensure that all newly designated Engineering Duty Officers (146X) are ordered to the EDO School Basic Course prior to the experience phase of their EDQP. The Chairperson of the EDQB must approve exceptions to this process.

(2) Ensure that, except in cases where the needs of the Navy preclude it, each EDQP candidate is ordered to an experience phase billet, preferably at an industrial activity, wherein he or she will be able to complete the EDQP and continue to acquire the education, training and professional experience required for additional certification within their chosen career fields in the DoN Acquisition Workforce.

(3) Establish and maintain a close relationship with the Commanding Officer of the EDO School and the Director, Acquisition Career Management (DACM) to ensure that Community training and qualification requirements are coordinated and in accordance with the requirements of the Defense Acquisition Workforce Improvement Act (DAWIA).

f. <u>Commanding Officer of the Engineering Duty Officer School</u>

(1) Operate the EDO School under the provisions of reference (b).

(2) Serve as administrator and coordinator for all aspects of the EDQP. This includes, but is not limited to:

(a) Assigning Certifying Officers.

(b) Assigning qualification dates to graduates of the basic course based on their existing orders.

(c) Participating in oral examinations as necessary to ensure high standards and consistency are maintained.

(d) Providing support to Certifying Officers, Counseling Officers, and candidates as required, ensuring qualification within two years.

(e) Developing and recommending EDQP changes to the EDQB.

(f) Maintaining a record of each candidate's progress.

(g) Establishing and maintaining a close relationship with the Senior ED Detailer (PERS 445) and the Navy DACM to ensure that Community training and qualification requirements are coordinated and in accordance with DAWIA requirements and policies.

(3) Provide administrative support to the EDQB, serve as recorder, coordinate with NAVSEA 00ZP as necessary, to arrange for meeting rooms, and prepare agenda for and minutes of each meeting.

g. <u>Certifying Officer</u>. The Certifying Officer is that Engineering Duty Captain or Flag Officer assigned by the Commanding Officer of the EDO School as the person responsible for overseeing the candidate's completion of the experience and certifying phases of the EDQP. In unusual situations, and when approved by the EDQB, the Certifying Officer may be a Commander. The Certifying Officer will:

(1) Ensure that candidates are placed in positions in which they can gain the experience needed to be successful as an Engineering Duty Officer and pursue additional certification within the Acquisition Workforce. Certifying Officers should make these assignments carefully, taking into full consideration the officer's and the Community's needs. <u>This first assignment is crucial in the officer's development</u>. Certainly, during this "apprenticeship", the candidate is expected to do productive work, but the Certifying Officer should also give the officer as much indoctrination into various aspects of the command, the ED Community and the DoN Acquisition Workforce as possible. <u>This assignment should be an intensive LEARNING EXPERIENCE for the candidate</u>. Where the Certifying Officer is not the candidate's Commanding Officer, he or she must establish the necessary relationship with the Commanding Officer to ensure that the needs of the Community and the officer are well served. <u>The finest judgment must be exercised in making the experience phase assignment. Personal involvement by the Certifying Officer is essential</u>.

(2) Provide written guidance (see sample, enclosure (4)) to each EDQP candidate concerning his or her qualification program. This document will be provided to the officer within 30 days of receipt of notification of assignment as the Certifying Officer, with copies provided to the Director, Engineering Duty Officer Plans and Policies (SEA 00ZP) and the Commanding Officer of the EDO School. Guidance, at a minimum, will include:

(a) Definition of mission-related training and qualifications (e.g., docking officer) that the individual will be expected to complete.

(b) A description of the methods and schedule by which progress will be monitored.

(c) An outline to assist the individual in establishing a program for continued development and additional certification within the DoN Acquisition Workforce appropriate to the candidate officer's grade and the billet to which they are assigned.

(d) A description of the subject areas to be covered in the oral examination.

(3) Document the candidate's EDQP progress in his or her fitness report. If the Certifying Officer is not the candidate's Commanding Officer, a letter that describes performance should be sent to the Commanding Officer, along with a request that the candidate's EDQP performance be documented in the fitness report.

(4) Notify the Commanding Officer of the EDO School and the ED Plans and Policies Office at least six weeks in advance of the oral examination.

(5) Conduct an oral examination of the candidate within two years of assignment. This responsibility may not be delegated. Guidance concerning this examination is presented in enclosures (5) and (6).

(6) If the candidate fails the initial oral examination, conduct reexaminations as necessary. The first reexamination shall occur within three months of the initial failure. The Commanding Officer of the EDO School must be notified of such failures. If it appears probable that the candidate will not be successful during reexamination, an EDO School representative should be present at subsequent reexaminations and MUST be present if the candidate has previously failed twice.

(7) Recommend for qualification those candidates who successfully complete EDQP requirements using the format of the sample letter, enclosure (7).

(8) Advise, in writing, the Chairperson of the EDQB, via the Director, ED Plans and Policies, with a copy to the Commanding Officer of the EDO School, when any candidate is in danger of failing to complete EDQP within two years or appears to be unable to achieve the standards for qualification. Recommendations and detailed justification for the officer's continued participation (if warranted) must be included in this letter. Letters requesting an extension to the EDQP must be received in sufficient time for the EDQB to consider the request prior to the expiration of the two-year time limit.

(9) Initiate a request to terminate a candidate who is unable to achieve the required standards for qualification or will leave active duty service prior to EDQP completion. The letter should be sent to the Chairperson of the EDQB via the Director, ED Plans and Policies, with a copy sent to the Commanding Officer of the EDO School.

(10) Assign Counseling Officers, as required.

(11) In the interest of continual improvement, conduct periodic EDQP progress assessments with the Counseling Officer, with any significant recommendations forwarded to the Chairperson

of the EDQB, with a copy to the Commanding Officer of the EDO School.

       (12) Notify the Commanding Officer, EDO School, as soon as possible if unable to complete responsibilities as Certifying Officer for assigned candidates. Some examples of when this might occur are:

           (a) Relief is not an ED Captain or ED Flag Officer

           (b) Command is being disestablished

           (c) Certifying Officer (and not the Commanding Officer) is retiring from active duty.

In any of these situations, the EDO School Commanding Officer will reassign the candidate's Certifying Officer. To ensure continuity of the qualification process, it is incumbent on the "losing" Certifying Officer to provide a detailed program status to the "gaining" Certifying Officer.

       (13) Ensure that an individual is assigned to manage DAWIA Level Two and Three certification course assignments and track readiness for Acquisition Professional Community membership, and DAWIA Continuous Learning requirements for all command EDs.

       (14) Include the EDO School on distribution for any local instructions related to the EDQP, including the local command's qualification instruction.

    h. <u>Counseling Officers</u>. The Counseling Officer is a qualified Engineering Duty Officer senior in grade to the candidate and assigned by the candidate's Certifying Officer to assist newly selected Engineering Duty Officers during their qualification. Counseling Officers shall be graduates of the EDO Senior course. If this requirement cannot be met at the command, the command should consult with SEA 00ZP and/or CO, EDO School to determine the best alternative candidate to serve as Counseling Officer. The delegation of Counseling Officer responsibilities is not mandatory; some Certifying Officers may elect to exercise these duties themselves. In small commands or those commands with few EDs, the Certifying Officer may not be able to delegate these activities to a junior officer, and therefore acts as the Counseling Officer. In cases where the Certifying Officer is not the candidate's Commanding Officer, both will agree to the Counseling Officer assignment. The Counseling Officer will:

       (1) Assist the Certifying Officer in monitoring and supervising the candidate's participation in the EDQP and continued development in the Acquisition Workforce.

(2) Ensure that the candidate maintains a pace that will permit qualification within the two-year time limit. This is particularly important if that candidate is simultaneously pursuing ED Dolphin qualifications. Each candidate shall be required to establish a Plan of Action and Milestones (POA&M) describing their plan to complete qualifications.

(3) Maintain a file on each candidate containing: the letter assigning the Certifying Officer; the tasking letter from the command; a POA&M with current status; and other correspondence such as requests for waivers or extensions.

(4) At least quarterly, evaluate and apprise the candidate of his progress in qualifying. The Counseling Officer should meet on a periodic basis with each candidate to determine the candidate's progress towards qualification. The candidate's progress should be formally noted and reported to the Certifying/Commanding Officer. The key measure of success is to have the candidate fully qualified for the designator change to 1440.

(5) Assist in conducting the oral examination, including scheduling and coordination of "pre-boards" and the final oral examination.

(6) Keep the Commanding Officer and Certifying Officer advised on the candidate's progress.

i. EDQP Coordinator. Some commands may find it beneficial to assign a program coordinator for the EDQP. This is expected to be the case for commands with several candidates pursuing qualification in parallel, or with candidates arriving on a continuing basis. It should always be considered a measure to be employed at the discretion of the Certifying Officer. The EDQP Coordinator should be a qualified ED with significant experience as an ED. The person need not be a Commander or graduate of the Senior Course, but this collateral duty should not be routinely assigned to the most recently qualified ED at the command. Instead, the job should be viewed as a stepping-stone toward becoming a Counseling Officer and other future leadership assignments within the community. Where assigned, the EDQP Coordinator will:

(1) Maintain the file of pertinent data on all current candidates referred to in paragraph 7.h. (3) above, as well as a listing of each candidate, the assigned counseling officer, and required completion date.

(2) Assist candidates and/or Certifying Officers in preparation and submission of all EDQP related correspondence.

(3) Act as a primary liaison between the command and the EDO School for routine matters related to the EDQP.

(4) Maintain local instructions related to the EDQP, and ensure the EDO School has current copies of these local instructions.

(5) Assist the Counseling Officers with coordination and scheduling of "pre-boards" and final oral exams.

j. Candidates. The Candidate shall:

(1) Satisfy all requirements for entrance into the ED community.

(2) Successfully complete an approved technical Master's degree program.

(3) Successfully complete the ED Basic Course.

(4) Complete the experience and certifying phase program developed by the Certifying Officer.

(5) Lead a Lean Rapid Improvement event, as described in enclosure (8).

(6) Pursue a program for professional development leading to additional certification within the Defense Acquisition Workforce. This may include attending DAWIA training courses applicable to the candidate's primary acquisition career field as determined by billet. The amount of progress a candidate should be required to make toward career field certification prior to the oral examination is entirely at the discretion of the Certifying Officer.

(7) Perform satisfactorily during the experience phase.

(8) Pass the oral examination within two years of commencing the experience phase.

(9) Initiate extension requests when extraordinary circumstances prevent completion of the EDQP within two years. Although the candidate is responsible for initiating this process, the extension request is from the Certifying Officer to the EDQB, **NOT** from the candidate. Letters requesting an extension to the EDQP must be received in sufficient time for the EDQB to consider the request prior to the expiration of the two-year time limit.

k. Commanding Officers and Officers in Charge of activities under NAVSEA's span of control shall:

(1) Support the EDQP.

(2) Provide funds for EDQP and Acquisition Workforce certification related travel, training and administration.  This includes funding travel and per diem for staff members to participate as EDO School guest lecturers.


8.  <u>The Qualified ED</u>.  At the conclusion of the qualification process the newly qualified ED should have the following attributes:

a.  Technically knowledgeable in his field.

b.  Conversant on the technical challenges facing the Navy and the Engineering Duty Officer community.

c.  Articulate in writing and speech.

d.  Current on the scope of the ED community and its role in the Navy, and the requirements for certification in the Acquisition Workforce.

e.  Prepared to pursue a narrow technical specialty while gaining breadth and depth in the wide range of ED and Acquisition Workforce endeavors.

It should be noted that EDQP is only "the start"; continual personal and professional improvement should be the goal of every Engineering Duty Officer.


P. E. SULLIVAN

Distribution:
SNDL     A5      CHNAVPERS (PERS 445)
         FKA1B   COMSPAWARSYSCOM
         FKA8    DIRSSP Activities
         FKP     COMNAVSEASYSCOM Shore Activities
         FKQ     COMSPAWARSYSCOM Shore Activities
         FT88    EDOSCOL

Copy to:
SNDL     A3      CNO (N4, N43, N6, N75, N76, N77, N78)
         A1J1L PEO IWS
         A1J1M PEO LMW
         A1J1P PEO SHIPS
         A1J1N PEO SUB
         A1J1Q PEO CARRIERS
         B2A     DISA
         21A1    COMFLTFORCOM
         21A2    COMPACFLT
         22A     Fleet Commanders
         24      Type Commanders (less 24H and 24J)
         26F3    COMOPTEVFOR only
         29B     Aircraft Carrier (CV) (CVN)
         32DD    Submarine Tender (AS)
         C84B    COMNAVSEASYSCOM Detachments
         FKQ6    Research and Development Activities
                 (Less FKQ6A & FKQ6E)
         FB30    NAVSHIPREPFAC
         FF8     Inspection and Survey Board
         FF38    USNA
         FF42    NAVPGSCOL
         FT1     CNET
         FT74    NROTCU (Massachusetts Institute of Technology
                    Only)
NAVSEA Special List Y2
NAVSEA 00Z

GRADUATE EDUCATION CURRICULA APPROVED FOR ENGINEERING DUTY
OFFICERS


**MAJOR**                                         **SUBSPECIALTY CODE**


Naval Construction/Engineering              51XX

Nuclear Engineering                         52XX

Naval/Mechanical Engineering                56XX

Electronic Systems Engineering              53XX

Electrical Engineering                      53XX

Combat Systems Sciences and Technology      57XX

Space Systems Engineering                   55XX

Systems Engineering                         58XX

Computer Science                            6203

Enclosure (1)

DESCRIPTIONS OF CORE COURSES

EDO SCHOOL BASIC COURSE

The Basic Course is a five-week course designed to provide all
newly selected Engineering Duty Officers with knowledge of those
plans, programs, policies, and procedures by which the Navy
accomplishes the acquisition and life cycle engineering of naval
ships and systems.  The course does not teach engineering in an
academic sense; entering students are, for the most part, already
graduate engineers.  Rather, the course focuses on those methods
by which the Navy manages the engineering of its ships and
systems.  In addition to subjects taught by staff and other
subject matter experts, students receive approximately 25 percent
of their instruction from senior community leaders, including
Flag Officers and Senior Executive Service members in specific
program areas.  These guest lecturers provide "SITREPs" on the
most recent information in a given field and as successful role
models, dispense first-hand leadership advice.  The course
includes the opportunity for career counseling with several
senior community members, usually including one or more ED Flag
Officers.  The course is certified to provide equivalency for the
DAWIA ACQ101 and ACQ201 courses.  This course is usually taught
four times a year at the EDO School.

LEAN MANUFACTURING AND QUALITY TRAINING

The five-day classroom training is designed to provide a
practitioner's level of understanding and application of the Lean
Six-Sigma Process Improvement methodology.  The course addresses
the technical, cultural, financial and management components of
process improvement.  The student will learn to apply the model
to transactional and production processes.  Basic Lean principles
and tools such as Value Stream Mapping & Analysis, Visual
Controls, 5S workplace organization, and Poke-Yoke will be
presented.  Principles and tools from the Six-Sigma discipline
will include project selection, project validation, statistical
analysis and the process of Define, Measure, Analyze, Improve,
and Control (DMAIC).  Constraint management techniques, i.e., the
Theory of Constraints (TOC) will also be demonstrated. This
training is intended to lead to Lean Six-Sigma Green Belt
certification and shall meet the standards prescribed in
enclosure (9).

EDO SCHOOL SENIOR COURSE

The Senior Course is a two-week course for Engineering Duty
Officers who have been selected to the rank of Commander.
Attendance is required within two years of selection.  The course
prepares students for increased responsibilities in the
acquisition and life-cycle engineering management of naval ships
and systems.  In addition, students are prepared for their roles
as senior officers in the ED and Acquisition Professional

Community.  This seminar-style course is primarily taught by
senior (O-6 and above) guest lecturers.  Topics are selected to
provide a broadened knowledge of naval engineering leadership and
management techniques, as well as an awareness of new
developments in engineering technology.  In addition to the
classroom sessions, each student receives a one-on-one career
counseling session from one or more ED Flag Officers.  This
course is usually taught three times a year at the EDO School.

## ADVANCED MANAGEMENT PROGRAM (AMP)

The Advanced Management Program is a visionary management course.
It provides tools to high-potential managers that are necessary
in today's challenging workplace. This three-week residential
program challenges participants beyond their current
capabilities.  Strategic thinking is the focus in this dynamic
learning environment.  Taught by faculty from the University of
North Carolina Tench Francis School of Business at the Navy
Supply Corps School in Athens, Georgia, this course features 3-4
offerings per calendar year and is mandatory for all O-5/O-5
selects.  Tuition funding is centrally managed by NAVSEA 00ZP
with attendance managed by the ED School.

## INTRODUCTION TO SUPERVISION OF CIVILIAN PERSONNEL

This training is designed to familiarize new supervisors with
federal and local Human Resource (HR) policies and procedures.
This training is available and taught regularly through local HR
resources and is mandatory for all qualifying EDs.

## CAPTAIN'S SEMINAR

The Captain's Seminar is a two-day seminar designed to give newly
selected Captains a broadened perspective of their role as ED and
Acquisition Professional Community leaders.  Students are advised
of the most current issues faced by the leadership, and are
provided with information which will be helpful to them in
execution of their responsibilities as Engineering Duty Officer
Captains (e.g., "Role of the Certifying Officer," "Selection
Board Procedures," "Engineering Duty Officer Accession
Standards").  This seminar is conducted annually.

EDQP PHASES

## Phase 1 - ENTRY

The ED Community is very selective.  It seeks technically capable officers who have proven their performance in operational warfare specialty jobs and who have the potential to perform successfully in demanding positions in acquisition and fleet maintenance. Promotion potential is a definite consideration in the selection process; unrestricted line (URL) records must be competitive. Academic success or demonstrated potential in technical fields is an additional important prerequisite.

Officers are normally selected in two ways, either via the ED Option Program or, more commonly, by lateral transfer from an unrestricted line community.  In extremely rare cases, an officer may enter through direct commissioning.

ED option candidates must have completed an undergraduate degree in either the engineering or scientific fields, having attained at least a "B" average and a ranking within the top 25 percent of their class.

Lateral transfer candidates are selected via administrative selection board.  It is expected that they will have completed two sea tours, earned an undergraduate degree while attaining at least a "B-" or better average and a ranking within the top third of their graduating classes; or have a Master's degree in an approved field.  Selected individuals not having a Master's degree, but demonstrating high potential for academic success, will be sent to graduate school to obtain a Master's degree in an approved field.  A very small number of officers will be offered the opportunity to complete an engineer's degree or doctorate.

Except in unusual circumstances (e.g., physical disqualification or General Unrestricted Line designation), candidates for the ED Community are expected to have achieved warfare qualification. Officers without warfare qualification, or surface warfare officers seeking qualifications in submarines, may have the opportunity to pursue ED Dolphin qualification after entry into the Community.

## Phase 2 - POSTGRADUATE EDUCATION

To serve effectively as a technical manager and to have credibility with those with whom they will work, EDs must have at least a Master's degree and subspecialty code of "P" or higher in an approved technical field.  These fields, published annually by OPNAVNOTE 1520, are listed in enclosure (1) of this instruction. Together, the completion of the educational skill requirements and the degree lead to the assignment of "P" or higher subspecialty code.

## Phase 3 - BASIC COURSE

The Basic Course, taught at the EDO School is required for all Engineering Duty Officers. The Basic Course prepares its graduates to deal effectively with the complex world they will face. Described elsewhere in this instruction, the course is intensive and demands the full attention of each student.

## Phase 4 - EXPERIENCE

Successful performance in this phase is a prerequisite to qualification. The first ED assignment after the Basic Course should provide the candidate with the widest possible exposure to the ED environment and Acquisition Workforce career fields in which he or she will later work. Each activity will present the candidate with unique situations and allow the individual to develop skills that will benefit both the candidate and community in following tours of duty. The purpose of the experience tour is to allow the candidate to acquire the core knowledge required by the ED Community and to build a foundation for subsequent assignments of increasing responsibility. Technical mastery, leadership, and growth are all important factors that are considered by the Certifying Officer. During this phase, officers frequently must complete training requirements and qualifications. A program for development and additional certification within the DoN Acquisition Workforce Program appropriate to the candidate officer's grade and the billet to which they are assigned will be pursued.

## Phase 5 - CERTIFICATION

During this phase, officers satisfactorily complete an oral examination and present their Lean Rapid Improvement Event results. The Certifying Officer then recommends that completion of the EDQP be certified, or conditionally certified subject to completion of a graduate degree.

Enclosure (3)

SAMPLE GUIDANCE LETTER

From:  (Certifying Officer)
To:    (Candidate's Name)

Subj:  REQUIREMENTS FOR COMPLETION OF THE ENGINEERING DUTY
       OFFICER QUALIFICATION PROGRAM (EDQP)

Ref:   (a) EDOSCOL ltr _____ of _____
       (b) NAVSEAINST 5400.55H
       (c) (If appropriate, i.e., local command EDQP
             Instruction, etc.)
       (d) (If appropriate)

Encl:  (1) (If appropriate, i.e., Mission Oriented Functional
             Elements, etc.)

1.  Reference (a) designated me as your EDQP Certifying Officer.
(Name/Rank) is assigned as your Counseling Officer.

2.  In accordance with reference(s) (b) (and (c) if applicable),
your Engineering Duty Qualification Program will consist of the
following elements:

     a.  Mission related training/qualification in your primary
duty assignment which may/will consist of the following:

               (List as appropriate)

     b.  Establishing and pursuing a program for continuing your
professional development and achieving additional certification
within the DoN Acquisition Workforce appropriate to your grade
and the billet to which you are assigned such as the following:

               (List as appropriate)

3.  (Statement regarding progress reviews/pre-boarding
requirements with the Counseling Officer.)

4.  Your oral examination will be scheduled not later than (Date)
and will cover the following topics:

                 (List topics)

5.  It is your responsibility to complete your EDQP within two
years (or appropriate timeframe if in an accelerated training
program), and your progress will be noted in your fitness report.
Any questions you may have concerning EDQP should be directed to
_____.

CERTIFYING OFFICER

Copy to:
CO, EDOSCOL
NAVSEA (SEA 00ZP)
BUPERS (PERS 445)
Candidate's CO (if appropriate)
(Candidate's Counseling Officer)

ORAL EXAMINATION GUIDANCE

1.  The oral examination, conducted by the Certifying Officer (a responsibility which may not be delegated) within the two-year limit, is intended to serve as the capstone of the EDQP process. During the two to three hour examination, the candidate presents the required Lean Rapid Improvement Event results paper and is challenged with questions intended to <u>assess understanding of the relationships between his or her technical education, knowledge of the plans, policies, programs and procedures learned at the EDO School, and on-the-job experience</u>.  It must be clear to both the board and the candidate that the intent of this examination is to certify an appropriate level of knowledge and mastery of topics of concern to the entire Engineering Duty community, not just those areas especially relevant to a particular specialty area within the community.  It is a "community qualification" not a "command qualification."  The final oral board is the capstone experience in the process that develops future leaders of the community.  In order to provide a board experience that achieves this intent, the Certifying Officer should strive to construct a board whose composition reflects the breadth of the ED community expertise.  Inviting senior ED Officers from other local commands or timing boards to convene when other senior officers are traveling in the area may accomplish this.  The objective should be to include officers with a variety of career paths and goals on the board.  Senior members of the civil service are another potential source of experience from which board membership may be drawn.  The Certifying Officer should ensure that all board members understand the intent and Certifying Officer's desires relative to the conduct of the board before convening.

2.  <u>EDO School Notification</u>.  The certifying command must notify EDO School no later than six weeks before the qualification board.  This notification serves two distinct functions.  First, it allows the EDO School time to coordinate the timing of, and attend if possible, multiple boards in a geographic location. This conserves travel funds.  Second, it allows EDO School to monitor a larger number of qualification boards and provide feedback to the EDQB, the TAB, and the Command.

3.  <u>Board Preparation</u>.  Candidates must project confidence and professionalism at their board.  Communication skills and "boardsmanship" are essential.  The ability to think on one's feet and formulate reasonable answers to questions is a skill that generally must be learned.  It is developed over time and with practice.  Candidates will be given opportunities to brief seniors and peers as a normal part of their duties.  If briefs and presentations are not a normal part of the candidate's duties, organizations such as *Toastmasters* can provide experience in public speaking.  If presentation weaknesses exist, candidates should take steps to improve their presentation skills <u>before</u> scheduling the board.

4. <u>Trial Boards</u>:

a. The use of trial or "pre-boards" should provide the candidate with a positive learning experience. Informal and hastily convened practice or "murder" boards do more harm than good. The trial boards should conform to the same standards of formality and structure that apply to the qualification board. Canned questions should be avoided. The parroting of convoluted procedures or a "data dump" of an organizational chart does not display the adaptiveness or resourcefulness of the candidate. After all, the candidate probably has already completed a technical master's degree. The first practice boards should be scheduled at least three months before the candidate's expected qualification date. Additional boards should be scheduled as deemed necessary by the Counseling Officer. Although not mandatory, multiple pre-boards allow for the exploration of multiple topics in detail, as well as additional opportunities to present and defend the professional paper. These boards should challenge the candidate's ability to "think on their feet" as well as practice good use of the white board. Often, the difference between superior performance and disappointing performance at the candidate's final oral board lies in the number and quality of pre-boards conducted by the Counseling Officer. In the final analysis, a candidate's performance at the final board is a reflection on both the candidate AND the Counseling Officer.

b. Pre-boards may also serve as a training opportunity. At the Certifying Officer's discretion, other candidates may be allowed to observe the primary candidate's pre-boards. Unqualified candidates observing actual a final oral board is inappropriate.

5. <u>The Oral Examination</u>:

a. <u>Introduction</u>. The Certifying Officer initially makes opening remarks, introduces the board members and the candidate. The candidate then spends five to ten minutes providing a self-introduction and explaining what duties he/she performs at the activity. The introduction may include education, past assignments, qualifications earned, status of certification within the DoN Acquisition Workforce, and future plans. This puts the candidate at ease and sets the tone for the board.

b. <u>Lean Rapid Improvement Event Results Presentation</u>. Following the introduction, the candidate will present his/her Lean Rapid Improvement Event results. This presentation should be practiced beforehand! First impressions are important. Hand drawn viewgraphs and scrawled charts are unprofessional. The candidate should analyze the audience, and prepare his or her presentation accordingly. In general, the presentation must get

the major point(s) across with the requisite amount of detail to support Rapid Improvement Event Results. This is the only "graded" section of the board the candidate controls. It should last twenty to forty minutes and should be followed by ten to fifteen minutes of discussion. Generally, a short break follows this question and answer period.

    c. <u>Job/Command Related Subjects</u>. The second section addresses subjects related to the activity. This will vary with each command. Board members should ask broad questions on which the candidate may expand. Examples: "Who are your customers? What services do you provide them?"; "A civilian employee approaches you and requests advice about sexually explicit language used in the work place. What do you do?" Expect to allocate thirty to sixty minutes for this section.

    d. <u>ED/Community Related Subjects</u>. This section relates to current events affecting the ED community. Topics such as ongoing improvement initiatives, the submarine workload, reduction in force, congressional initiatives and other flag initiatives should be explored. The board will probe the candidate for knowledge of policies, procedures and practices that may influence his future, the future of the ED community, and the Navy. The <u>ED Newsletter</u>, <u>Proceedings</u>, <u>Navy Times</u>, and <u>U.S. News and World Report</u> are all possible sources of material for questions. There may often be no "right" answers to the questions asked during this part of the examination. The candidate should respond with reasoned, thoughtful answers. Expect to allocate about thirty to sixty minutes for this area.

    e. <u>Questions</u>. It is important to note that the oral examination is NOT intended as an opportunity for the candidate to recite detailed professional information, organization charts memorized at the EDO School and courses attended as part of Acquisition Workforce training, or to draw complex system wiring or piping diagrams. Rather, questions should test the candidate's ability to see the "big picture" as it relates to his or her job.

    (1) An example of a question to use for an officer in a shipyard might be:

"You were an assistant project superintendent for a nuclear submarine during the experience phase of your EDQP. Explain the process the Navy used to make resources; i.e., money, material, technical knowledge and manpower available to execute this overhaul of the submarine. Emphasize how these resources were used in this shipyard. As you answer, comment on deficiencies and advantages of the process and explain how you, as a person who holds a master's degree in naval architecture, personally made the process operate more effectively."

This type of question allows the candidate great latitude when answering and permits the Certifying Officer to assess the candidate's ability to organize his/her thoughts and to synthesize the "big picture" from professional education, EDO School training and practical experience. Follow-up questions should be asked as appropriate to steer the candidate to other areas of interest. In fact, answers to this type of open-ended question can take up the entire time allowed for the examination.

      (2) Examples of questions to be avoided, because they only assess the candidate's memorization abilities, include:

"Draw the organization chart for NAVSEA." (The candidate's answer to the suggested question above will bring out if he or she understands NAVSEA's role in submarine overhauls.)

"Who is NAVSEA 04?" (It is less important for the candidate to know the person's name than to know how the position fits into the big picture of submarine repair.)

"Draw the HP air system for the submarine for which you are assistant project superintendent." (A more appropriate question might be: "The HP air system on your submarine was a very 'challenging' part of the overhaul, causing the boat to complete three weeks late. Why did this happen? What were the technical problems? How did you solve the problems? What could be done to prevent problems in future overhauls?")

6. The following requirements apply to the administration of the oral examination:

    a. The Certifying Officer must convene an oral examination panel of at least three Engineering Duty Officers equal or senior in rank to the candidate. The Certifying Officer's goal should be to have at least three ED Captains on the board, although this should not be considered a requirement. In cases where the Certifying Officer is not the candidate's Commanding Officer, the Commanding Officer should be invited. Qualification board membership should not be limited to the senior officers in a command, or surrounding commands. Certifying/Commanding Officers are encouraged to provide for more diversity in the makeup of these boards by including senior civilians and mid-grade ED officers from nearby commands.

    b. The Certifying Officer is the Chairperson of the panel except when the Certifying Officer is a Commander. In such a case, a Flag Officer or Captain must serve as Chairperson.

    c. The Certifying Officer may, at his/her discretion conduct, or cause to have conducted, one or more "pre-boards" which can serve to assess the candidate's readiness for the oral examination.

          Enclosure (5)

d.   A representative of the Engineering Duty Officer School must be invited, and may serve on the panel.  A representative MUST be present if the candidate has failed two oral examinations (exclusive of "pre-boards").

e.   Normally, a candidate will not be permitted more than three opportunities to successfully complete the oral examination.  The Chairperson of the EDQB will approve exceptions.

f.   Enclosure (6) provides a sample letter announcing the convening of the oral examination.

g.   The Board will examine only one candidate at a time. Certifying Officers should take care to ensure that the oral examination is a productive, memorable event.  Remember, the intent is to cover, in a few short hours, the entire EDQP process.  The Certifying Officer's personal effort in terms planning and participation are extremely crucial to a successful outcome.

SAMPLE ORAL EXAMINATION ANNOUNCEMENT LETTER

From:   Commanding Officer (or Certifying Officer)

Subj:   ENGINEERING DUTY QUALIFICATION PROGRAM (EDQP) ORAL
        EXAMINATION FOR _____

Ref:    (a) NAVSEAINST 5400.55H

Encl:   (1) Service Biography
        (2) Acquisition Workforce Training and Certification
        (3) Lean Rapid Improvement Event Results Paper
        (4) Map to Command (if appropriate)
        (5) Etc.

1.  In accordance with the provisions of reference (a), the EDQP
oral examination for (candidate's name) will be conducted at this
command (location) at (time/date) and will last for approximately
three hours.  Board members are:

(List Board Members)

2.  The candidate will spend the first 15 - 30 minutes making a
brief presentation covering the following subjects:

        - Biographical information.
        - A brief overview of (his/her) Command.
        - A discussion of (his/her) contributions to the Command.
        - (His/Her) perceptions of the ED Community, its role, and
          (his/her) role within it.
        - (His/Her) career aspirations.

3.  The candidate's Rapid Improvement Event results will be
presented during the next 20 to 40 minutes, followed by 10-15
minutes of questions regarding the Lean Event presentation.  The
remaining time will be used to question the candidate.  Board
members are requested to prepare challenging questions designed
to require the candidate to think on (his/her) feet under stress
and make use of the knowledge (he/she) has acquired through
training and experience.  Enclosures (1) and (2) provide
information concerning the candidate's background.

4.  Administrative information as required (parking, security
clearance, etc.)related to additional enclosures, if appropriate.

CERTIFYING OFFICER

Distribution:

Copy to:
NAVSEA (SEA 00ZP)
CO, EDOSCOL

SAMPLE FORMAT FOR EDQP COMPLETION LETTER

From:  (Certifying Officer)
To:    Commander, Naval Sea Systems Command (SEA 00ZP)

Subj:  CERTIFICATION (or CONDITIONAL CERTIFICATION*) OF
       COMPLETION OF ENGINEERING DUTY QUALIFICATION PROGRAM
       (EDQP) BY (CANDIDATE)

Ref:   (a) EDO School ltr Ser _____ of _____
       (b) NAVSEAINST 5400.55H

1.  As EDQP Certifying Officer per reference (a) for (candidate's
name), I hereby recommend that (his/her) completion of EDQP be
certified (or conditionally certified*).  (Candidate's name) has
completed the prescribed requirements of the EDQP in accordance
with the provisions of reference (b).  This program included:

    a.  Successful completion of EDO School Basic Course (Class
_____).

    b.  Successful completion of mission oriented training as
follows:  (elaborate as appropriate - include statement of
qualifications attained.)

    c.  Successfully performing assigned duties while assigned to
(candidate's activity) from _____ to _____.  (Elaborate on
assigned duties and specific accomplishments.)

    d.  Successful completion of a Lean Rapid Improvement Event.

    e.  Successful completion of an oral examination, including a
presentation of his/her Lean Rapid Improvement Event Results,
conducted for the subject officer on _____.  (List
members of examining board and activity to which they are
attached, and time of oral and general topics covered during the
oral exam.)

    f.  Obtaining a technical Master's degree in (field) from
(school) in (year).

    g.  (Additional pertinent information as applicable.)


                        CERTIFYING OFFICER




*Conditional certification if the candidate has not completed an
approved technical Master's degree.

Copy to:
CO, EDOSCOL
BUPERS (Pers 445)
Candidate
Candidate's CO (if appropriate)

RAPID IMPROVEMENT EVENT (RIE) GUIDANCE

1. The Rapid Improvement Event (RIE) is an action-oriented effort that focuses on improving a targeted area derived from a Value Stream Analysis (VSA). This is usually a 7-week intensive effort with 3 weeks devoted to preparation, 1 week for the RIE workshop, and 3 weeks for follow-up. The candidate must provide a written report of the RIE results as part of the oral board

2. Preparation for the RIE should occur at least three (3) weeks prior to the workshop and should include:

   a. Selecting the value stream to be analyzed from the Enterprise Transformation Plan.
   b. Identifying the target area for improvement based on the Value Stream Analysis.
   c. Determining the focus (which Lean tools will be applied).
   d. Building the teams (identifying leader, co-leader, and members).
   e. Populating the team charter.

3. The Certifying Officer's involvement is critical to the success of this effort. Specific focus areas include:

   a. Clear objectives
   b. Measurable goals with targets
   c. Commitment of necessary resources (includes clearing personnel calendars for the workshop)
   d. Focus on timeliness (3-5 days for the workshop)
   e. Report on results

**LEAN MANAGEMENT AND QUALITY TRAINING STANDARDS[1]**

## I. Enterprise[2]-Wide Deployment

### A. *Enterprise view*

#### 1. Background and Approach

Understand the need for the enterprise transformation to a more efficient and effect organization to support the objectives of Sea Power 21, Sea Enterprise, the Fleet Response Plan, Intelligent Targets and winning the Global War on Terrorism.

#### 2. Value of Lean Six-Sigma

Understand the organizational value of LEAN, SIX-SIGMA and THEORY OF CONSTRAINTS, its philosophy, goals, and definition.

#### 3. Business systems and processes

Understand and distinguish interrelationships between business systems and processes.

#### 4. Process inputs, outputs, and feedback

Describe how process inputs, outputs, and feedback to the system impact the enterprise system as a whole.

### B. *Leadership*

#### 1. Enterprise Vision

Understand that the enterprise is intended to fully integrate Lean principles into its business strategy and establish a culture of continuous process improvement that provides value to the customer ands maximizes return investment.

#### 2. Enterprise leadership

Understand leadership roles in the deployment of Lean Six - Sigma (e.g., resources, organizational structure).

### 3. Lean and Six-Sigma roles and responsibilities

Understand the roles and responsibilities of Black Belt, Master Black Belt, Green Belt, Lean Champion, Value Stream Champion, Sensei, and Master Sensei.

## II. Business Process Management

### A. *Implementation Methodology*

#### 1. Implementation Activities

Understand the variety of implementation efforts. (Executive Planning Session, Value Stream Analysis, Rapid Improvement Events, Organization Assessment, etc)

#### 2. Analyze the Enterprise for Opportunity

Executive leadership conducts executive planning sessions to establish strategic direction and alignment with command hierarchy.

#### 3. Align Improvement Activities with the Business Strategy

Understand the Value Steam Identification/Value Stream Analysis process.

### B. *Process vs. functional view*

#### 1. Owners and stakeholders

Identify process owners (Value Stream Champions), internal and external customers, and other stakeholders.

### C. *Voice of the customer*

#### 1. Identify customer

Segment customers as applicable to a particular project; list specific customers impacted by project within each segment; show how a project impacts internal and external customers; recognize the financial impact of customer loyalty.

### D. Business results

#### 1. Financial benefits

Understand and present financial measures and other benefits (soft and hard) of a project; understand and use basic financial models return on investment (ROI).

## III. Project Management

### A. Team leadership

#### 1. Initiating teams

Know the elements of launching a team and why they are important: clear purpose, goals, commitment, ground rules, roles and responsibilities of team members, schedules, support from management, and team empowerment.

#### 2. Selecting team members

Aid in identifying team members who have appropriate skills sets (e.g., self-facilitation, technical/subject-matter expertise), and create teams with appropriate numbers of members and representation.

#### 2. Team stages

Facilitate the stages of team evolution, including forming, storming, norming, performing, adjourning (mourning), and recognition.

### B. Team dynamics and performance

#### 1. Team-building techniques

Recognize and apply the basic steps in team building: goals, roles and responsibilities, introductions, and both stated and hidden agendas.

#### 2. Team facilitation techniques

Apply coaching, mentoring, and facilitation techniques to guide a team and overcome problems such as overbearing, dominant, or reluctant participants, the unquestioned acceptance of opinions as facts, groupthink, feuding, floundering, the rush to accomplishment, digressions and tangents, etc.

### 3. Team performance evaluation

Measure team progress in relation to goals, objectives, and metrics that support team success.

### 4. Team tools

Define, select, and apply team tools such as nominal group technique, multivoting, conversion/diversion.

## IV. Lean Enterprise

### A. *Lean concepts*

#### 1. Theory of constraints

Understand and apply the Theory of Constraints (TOC) constraint management techniques to processes and value streams.  Understand and apply the 5-step methodology of TOC.  Understand what constraint management can accomplish. Relate TOC principles to Lean and Six Sigma principles and methods. Recognize bottlenecks and constraints in process flow.  Understand the concepts of effective utilization, throughput, inventory, work in progress, queuing and balance flow as it relates to CCPM.

#### 2. Lean thinking

Understand the concepts of becoming a Lean activity. Apply those concepts, <u>Value</u> as defined by the customer, a <u>Value Stream</u> that is composed of many individual process where there are no wasteful task, one piece Flow with out interruption or waste, Pull instead of push in response to demand and <u>Perfection;</u> continually improving the process.

#### 3. Value-add/ Non-value-added activities

Define "value added activities" as (1) desired by the customer and (2) Change the fit form or function and (3) are done right the first time.  Identify the 7 types of waste: overproduction, inventory, defects, over-processing, waiting, motion and transportation.

#### 4. Cycle-time reduction

Understand cycle time reduction can lead to increased capacity, improved quality reduction of waste and satisfying customer demand.  Describe how cycle-time reduction can be used to identify defects and non-value-added activities using kaizen-type methods to reduce waste of space, inventory, labor, and distance. Produce spaghetti and value stream maps.

**B. Lean tools**

Identify, understand and apply the practices that create a Lean activity such as, value stream mapping, workplace organization/5S, standard work, pull systems, single minute exchange of die, poke yoke, total productive maintenance, etc.

### 1. Workgroup technology

Focuses on arranging the way in which people and the equipment they use interact with the flow of the product through the value stream. Examples include L-shape, U-shape and combination cell layout.

### 2. Lot sizing

Understand the benefits of smaller lot sizes. Understand the difference in process lot size, transport lot size and order lot sizes. Analyze the process to produce at the optimum lot size.

### 3. Set-Up Reduction

Focus on reducing the impact on the value stream from setting up a process (people, equipment, materials) in order to generate product or services.

### 4. Just in time/Kanbans

Understand that kanbans and JIT work together in supporting in a Lean value stream flow.

## V. Define - Methodology *and Tools*

### A. *Project scope*

Determine project definition/scope using Pareto charts, process/value stream maps, etc.

### B. *Metrics*

Establish primary and consequential metrics (e.g., quality, cycle time, cost).

### C. *Problem statement*

Develop a problem statement, including baseline and improvement goals.

## VI. Measure - *Methodology and Tools*

### A. *Process analysis and documentation*

#### 1. Tools

Develop and review process maps, present state value stream maps, written procedures, work instructions, flowcharts, etc.

#### 2. Process inputs and outputs

Identify process input variables and process output variables, and document their relationships through cause and effect diagrams, relational matrices, etc.

#### 3. GEMBA

Perform "waste walks" to identify piles of WIP and process inefficiencies.

### B. *Basic statistics*

#### 1. Drawing valid statistical conclusions

Distinguish between enumerative (descriptive) and analytical (inferential) studies, and distinguish between a population parameter and a sample statistic.

#### 2. Central limit theorem and sampling distribution of the mean

Define the central limit theorem and understand its significance in the application of inferential statistics for confidence intervals, control charts, etc.

### C. *Collecting and summarizing data*

#### 1. Types of data

Identify, define, classify and compare continuous (variables) and discrete (attributes) data, and recognize opportunities to convert attributes data to variables measures.

#### 2. Methods for collecting data

Define and apply methods for collecting data such as check sheets.

### 3. Techniques for assuring data accuracy and integrity

Define and apply techniques for assuring data accuracy and integrity such as random sampling, stratified sampling, sample homogeneity, etc.

### 4. Descriptive statistics

Define, compute, and interpret measures of dispersion and central tendency, and construct and interpret frequency distributions and cumulative frequency distributions.

## VII. Control - *Methodology and Tools*

### A. *Statistical Process Control (SPC)*

#### 1. Objectives and benefits

Understand objectives and benefits of SPC (e.g., controlling process performance, distinguishing special from common causes).

#### 2. Analysis of control charts

Interpret control charts and distinguish between common and special causes using rules for determining statistical control.

### B. *Lean tools for control*

Apply appropriate lean tools (e.g., 5S (sorting, storage, shining, standardizing, sustaining), visual factory, kaizen, kanban, poka-yoke, standard work) as they relate to the control phase of DMAIC.

## VIII. Practical Demonstration

Participate in the Lean Repair Exercise
Participate in other classroom lesson specific exercises

## IX. Testing/Evaluation

Assist with three Rapid Improvement Events (RIEs) then facilitate and consult three teams in support of RIE under instruction.

**NOTES: 1.** The Lean Management and Quality Training Standards are derived from NAVSEA's Lean Six-Sigma Green Belt Training Standards.

**2.** The term enterprise refers to the command/organization.