PM REPORT

Project Management Career Development and Training

Needs Assessment and Strategy Development

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IWR PM RESEARCH AND DEVELOPMENT

PROJECT MANAGEMENT Career Development and Training

Needs Assessment and Strategy Development

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INTRODUCTION

This report summarizes research on the basic needs for project management career development and training in the Corps of Engineers, and development of a general strategy for satisfying those needs.

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Headquarters Sponsor. This project was sponsored by the Programs Division of the Civil Works Directorate (CECW-B) at HQUSACE. The Military Programs Directorate (CEMP-MP) and its Environmental Restoration Division (CEMP-RS) joined in its oversight. Mr. Gary Loew is the point of contact for CECW-B.

IWR Study Management. The Institute for Water Resources (IWR) managed this project. Dr. John Singley lead an R&D team including Mr. John Brill and Ms. Norma Jean Jaggard. IWR oversight was provided by Dr. Mark Dunning, Chief of its Programs Analysis Division.

Study Advisory Panel. A panel of seven project management experts advised the IWR team and assisted with the study. This panel included DDE(PPM)s and representatives of HQUSACE Civil Works, Military Programs, and Environmental Restoration (Table 1).

1. STUDY SPONSOR, PARTICIPANTS

HQ SPONSOR	OFFICE SYMBOL
Don Cluff	CECW-B
HQ MONITOR	
Gary Loew	CECW-BA
IWR LEADER	
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Bill Augustine	CECW-B
Bill Brasse	CEMP-MP
Greg Jordan	CEMP-RS
Bill Pearson	CESWA-DP
Roy Reed	CEMRK-DP
John Sirles	CEORL-DP
Sam Tosi	CENAD-PP

Study Objectives. Two related objectives guided this study: to assess the career development and training *needs* of Corps project managers, and to develop a viable *strategy* for satisfying those needs. Both serve the sponsor's goal of developing a master plan for career development and training in project management.

2. MAJOR OBJECTIVES OF STUDY

- Assess career development and training *needs* of PMs.
- Develop a viable *strategy* for satisfying the needs.

Overview of Study. This study began in March of 1993 with a 30-day effort to research the basic situation and develop a general framework for further study. Between May and August of 1993, field visits and a mail survey were used to assess development and training *needs*. And, between September of 1993 and February of 1994, the Training Advisory Panel (TAP) helped to develop a *strategy*.

Report Organization. The basic outline of this report reflects the three phases of the study: In the first chapter, the basic findings and framework of the *scoping* effort are summarized. The second chapter is devoted to reporting the methods and results of the *research* of the career development and training needs. And, the third chapter summarizes the *development* of a strategy and basic plan for satisfying those needs.

3. STUDY & REPORT ORGANIZATION

CHAPTER 1.	Study Goals and Framework
CHAPTER 2.	PM Career and Training Needs
CHAPTER 3.	PM Strategy and Plan Development

Related Documents. This study and report are part of a larger effort to develop a "master plan" for project management career development and training in the Corps. That larger effort has resulted in the reports listed in Table 4, including the results of an adjunct effort to field an "advanced course" for Corps project managers.

4. REPORTS: CAREERS & TRAINING

- Needs Assessment and Strategy Development
- Career Development and Training Handbook
- Project Management Course Directory
- "Advanced Course" Research Summary

Acknowledgments. IWR received the assistance and cooperation of many during the course of this study. We thank our advisors for their valuable contribution to understanding our survey results and their implications, and for their tireless efforts during our several workshops. We also thank our sponsor and the other HQUSACE proponents of project management for their patience with our process and their appreciation of its results. And, we especially thank the hundreds of project managers and supervisors who talked with us and filled out our survey. We hope that the process and outcomes of this project are of benefit to all of you.

We hope that the process and outcomes of this project are of benefit to all PMs and their supervisors.

STUDY GOALS AND FRAMEWORK

During the first month of this study, research was conducted to obtain a basic understanding of the PM career development and training situation in the Corps, and to develop a general framework for further study of important needs and improvement strategies. This first chapter of the report summarizes the results of that scoping effort.

ESRC PROGRAM

Review of Program

The Programs and Project Management function in the Corps was added to those included in the career program for Engineers and Scientists (Resources and Construction) in July 1992.[1] Guidance for the management of ESRC careers is provided in Chapter 11 of Army Regulation 690-950 and in the ESRC ACTEDS plan.[2] The AR contains general guidance and the ACTEDS plan includes career development and training plans for each of the ESRC functions.

STRUCTURE

The ESRC career field is organized into seven functions in which engineers and scientists in about 50 occupations perform jobs in positions graded between GS-5 and GS-15. Four career levels are generally recognized and used by both employees and supervisors to plan and manage careers and the work of the organization (Table 5).

5. STRUCTURE OF ESRC PROGRAM

- o 7 Major Functions:
  - Planning
  - Construction
  - Engineering
  - Facilities Engineering
  - Operations
  - Programs & Project Mgt
  - Research & Development

o 4 General Levels:	Grades
- Intern	5- 7
- Specialist	9-12
- Intermediate	12-13
- Management	13-15

The ESRC career program uses three career ladders: one for the five project development and operations functions, and separate ones for facilities engineering and research and development. The rungs on the ladders are "key positions". Except for the research and development ladder, most of the "key positions" are function or line management positions. The project manager is not a key position on any career ladder. Each of the seven functions has a separate set of development and training plans (consisting of a Career Development Plan or CDP, and a Master Training Plan or MTP). The CDPs specify development and training for all grades and levels, except that for programs and project management which omits Interns.

PROCEDURES

The primary responsibility for career planning and management rests with the employee. The Individual Development Plan or IDP is his or her key tool. Supervisors provide career counseling and help with IDPs.

The two main goals of career development and training are job performance and career advancement. Employees need to choose the right type of career development and training at the right time.

Employees need to choose the right type of career development and training at the right time.

Career development and training is acquired through two basic mechanisms, employer supported training and self-development activities (Table 6). Equal emphasis is ascribed to these mechanisms in the ESRC career program. On-the-job training or OJT is the kind of training relied upon most heavily. The ESRC program highly recommends cross-functional assignments, but cautions that they become increasingly impractical above the Specialist level. Early professional registration or certification is also advised.

6. WAYS OF ACQUIRING ESRC KSAs

- o Self-Development Activities:
  - Individual Studies
  - University Courses
  - Professional Group
    - * Participation
    - * Registration
- o Employer Supported Training:
  - On-the-Job
  - Developmental
  - Rotational
  - Formal Courses

COMPETENCIES

The CDPs indicate training and assignments to provide the KSAs (knowledges, skills, abilities) necessary for key positions in the career ladders. The ESRC program uses 23 KSAs, which are grouped into seven categories (Table 7).

7. KSAs NEEDED FOR ESRC JOBS

GROUPINGS OF KSAs[1]	KSA
Leadership/Supervision/ Management	6
Resource Management	2
Programming/Budgeting	1
Communication	2
Policy/Technical	6
Personnel	2
Functional	4
All KSAs	23

1/ KSA = Knowledges, Skills, and Abilities

The training and assignments indicated in the CDPs are also categorized and identified by their relative "availability", universal or competitive, and by their relative "necessity", mandatory or recommended (Table 8).

8. CATEGORIES OF ESRC TRAINING

- o Universal Training
  - Mandatory, Priority I
  - Mandatory, Priority II (Highly Recommended)
  - Recommended, Priority III
- o Competitive Training
  - Highly Recommended
  - Recommended

The MTPs also indicate the KSAs provided by the training and assignments and give each a basic description associated with the kind of job or role on which it focuses (Table 9).

9. DESCRIPTORS OF ESRC TRAINING

- o Supervisory
- o Management
- o Technical
- o Leadership
- o Functional

Analysis of PPM Plans

An analysis was made of the CDP and MTP for the PPM function to determine the kinds, amounts, and timing of training and development prescribed for this career. (*The numbers below are approximate.*)

TRAINING

About 45 training courses are listed in the plans for the PPM function. A tally of these by description indicates that 20 percent are project management or functional courses, although equal numbers are considered to be leadership and management courses (Table 10).

10. PM TRAINING by DESCRIPTION

DESCRIPTION	COURSES[1]
Supervisory	10%
Leadership	20
Management	20
Functional (PM)	20
Technical	30
All Courses	100

1/ About 45 courses are offered in plans.

Most of the 45 courses are universal, 80 percent compared to 20 percent for competitive courses. At just 15 percent, few of them are considered to be mandatory, although 40 percent are highly recommended (Table 11).

Courses in leadership and management need to be taken at the Specialist level, prior to becoming a TM or PM.

11. PM TRAINING by CATEGORY

CATEGORY	COURSES[1]
Universal	
Mandatory	15%
Highly Recommended	30
Recommended	35
Subtotal	80
Competitive	
Highly Recommended	10
Recommended	10
Subtotal	20
All Courses	100

1/ About 45 courses are offered in plans.

Looking at "availability" and "necessity" together, as a rough gauge of "importance", 60 percent of the courses described as functional are universal and at least highly recommended (Table 12). The management courses follow with 55 percent, but only 35 percent of the leadership courses rate this "important", 15 percent less than the supervisory courses.

12. PM TRAINING by IMPORTANCE

DESCRIPTION	COURSES[1]
Supervisory	50%
Leadership	35
Management	55
Functional (PM)	60
Technical	35
All Courses	45

1/ Percent of courses (within description) typed as Universal <u>and</u> Highly Recommended <u>or</u> Mandatory.

TIMING

In addition to *what* courses are taken, *when* they are taken is critical to job performance and career advancement. In order to prepare for the duties of project management, courses in leadership and management need to be taken at the Specialist level, prior to becoming a technical or project manager.

A tally of the 45 courses in the PPM plans, however, reveals that most are suggested at the Intermediate and Management levels. Only 40 percent are timed to prepare employees for project management jobs (Table 13). Half of the management courses are suggested at this level, and just 10 percent of the leadership training. All of the university long-term training and all developmental assignments except one are suggested for levels above the Specialist.

13. PM TRAINING of SPECIALISTS

DESCRIPTION	COURSES[1]
Supervisory	25%
Leadership	10
Management	50
Functional (PM)	50
Technical	40
All Courses	40

1/ Percent of courses (within description) offered at the Specialist level: 9 to 12.

General Observations

The review and analysis summarized above afforded general observations around which to focus research of needs and development of strategies.

✓ Basic technical competence is assumed, and training and development is focused on job performance and advancement.

✓ Career ladders and plans for project development functions, including project management, focus on line management jobs.

✓ While most formal training is common, specialization and reliance on OJT retards cross-functional training.

✓ Much of the formal training of benefit to project managers is suggested for grade levels at or above theirs.

✓ Although ascribed an equal role, self-development is given relatively little attention in this career guidance.

Career ladders and plans for project development functions, including project management, focus on line management jobs.

RESEARCH QUESTIONS

From this basic understanding of the PM career development and training situation, several questions were prepared to guide further research.

1. Is fitting the PPM function into the ESRC career program as the fifth project development and operations function likely to satisfy most of the career development and training needs of project managers?

2. Is PPM sufficiently like the other project development and operations functions to make their common treatment in the ESRC career program and plans a viable strategy for satisfying the needs of its PMs?

Are the career development and training needs of project managers sufficiently like the needs of technical staff and line managers to prescribe for them the same career ladder and very similar plans?

3. Are the career development and training needs of project managers sufficiently like the needs of technical staff and line managers to prescribe for them the same career ladder and very similar plans?

4. What is the work of project management and what are the competencies needed for job performance and advancement? What are its key functions and roles, what is their relative importance?

Are project managers trained and developed adequately to do their jobs? Are IDPs used to assure that the right training is obtained at the right time? What competencies are lacking?

5. Are project managers trained and developed adequately to do their jobs? Are IDPs used to assure that the right training is obtained at the right time? What competencies are lacking?

6. Is there a viable career path for project managers? Is there an adequate source of project managers? Are there adequate opportunities for project managers to advance?

7. What is the general status of project management in the United States as a field of study and professional career? Is the Corps taking advantage of this state-of-the-practice?

8. What is the (potential) role of professional certification of project managers? How does it contribute to development and training? How does it contribute to job performance and career advancement?

Is there a viable career path for project managers? Is there an adequate source of project managers? Are there adequate opportunities for project managers to advance?

In the needs assessment and strategy development chapters that follow, these observations and questions are explored with objective research and a panel of project management experts.

PM CAREER AND TRAINING NEEDS

During the Spring and Summer of 1993, research was conducted to assess the problems and the opportunities associated with PM career development and training in the Corps. A study was made of project management inside and outside the Corps, including a survey of district project managers and their supervisors. The methods and results of those efforts are summarized in this chapter.

EXAMINATION OF PM WORK

Basic Approach

The study of project management work involved a general review of open literature and Corps documents on the subject, and a conceptual analysis of relevant materials discovered in this review. The effort focused on the *work* performed in project management, the *techniques and tools* applied to perform the work, and the *competencies* needed to apply the techniques and tools and perform the work. Bottom-up (inductive) and top-down (deductive) analyses were used to develop the structure and the substance of the study results.

General Results

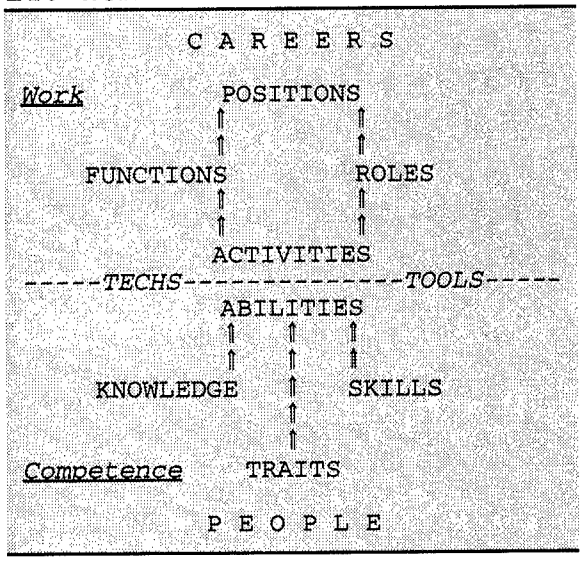
The results include a structure or conceptual framework for thinking about the work of PM, and the substance or ideas that fit into the framework and make the picture more concrete.

CONCEPTUAL FRAMEWORK

The work of project management requires two pictures or models to capture it. One is generic and relates *work* to *competence* at the general level of careers and people. The other focuses on project management and ties its basic *components of work* to the fundamental *categories of competence*.

Generic Work Model. Work is performed by *people* in jobs or *positions*. It consists of many *activities* that are organized into *functions* and *roles* (that define the jobs). *Techniques* and *tools* are applied in most activities. To perform work, people need *abilities* to apply the techniques and tools and accomplish the activities. The abilities of people derive from their professional *knowledge* and *skills* and their personal *traits*. (See Table 14.)

14. WORK: CAREERS & PEOPLE



Work Model for PM. The work of project management consists of activities organized into the basic functions of *planning, organizing, monitoring, controlling,* and *leading*. The last of these is *relational*, involving the leadership of *people*, while the others are *informational*, involving the management of *process*. The relational activities (people leadership) require primarily *interpersonal*, *intrapersonal*, and *communication* abilities, while the informational activities (process management) require primarily *conceptual*, *technical*, and *communication* abilities. (See Table 15.)

15. PM ACTIVITIES & ABILITIES

```
Work
                BUSINESS
                MANAGEMENT
                    ⇕
                PROJECT
                MANAGEMENT

PEOPLE ---- LEAD
Relational      PLAN        ----- PROCESS
  ⇑             ORGANIZE          Informational
  ⇑             MONITOR              ⇑
  ⇑             CONTROL              ⇑
  ⇑                                  ⇑
  ⇑                                  ⇑
        A C T I V I T I E S
-------------------------------------
        A B I L I T I E S
  ⇑                                  ⇑
  ⇑                                  ⇑
INTERPERSONAL              CONCEPTUAL
            COMMUNICATION
INTRAPERSONAL              TECHNICAL

Competence
```

The models provide a conceptual framework for organizing and associating project management activities, techniques, tools, and abilities, to include how project management roles fit into the picture (Table 16).

16. PM WORK, ROLES, COMPETENCE

```
                W O R K

RELATIONAL                INFORMATIONAL
-----------------------------------
                R O L E S

SUPERVISORY                 MANAGEMENT
LEADERSHIP               ADMINISTRATIVE
MANAGEMENT                    TECHNICAL
-----------------------------------
            C O M P E T E N C E

INTERPERSONAL               CONCEPTUAL
            COMMUNICATION
INTRAPERSONAL                 TECHNICAL
```

SUBSTANCE OF PM WORK

Three kinds of associations are critical to understanding the work of project management: 1) the basic activities comprising each of its functions, 2) the techniques and tools applied in the functions, and 3) the KSAPs or competencies required.

Functions and Activities. The review of open literature and Corps documents netted over 50 activities associated with the five basic project management functions, and another 20 tasks in business management. These were rolled-up into general activities (Tables 17 and 18).

17. BUSINESS MANAGEMENT TASKS

PM ENTERPRISE

- Manage project management organization
- Support the management of projects
- Know stakeholder concerns and their implications

PM ENVIRONMENT

- Develop a philosophy for managing external relations
- Manage relations with functional elements
- Manage relations with higher echelons

18. PM FUNCTIONS & ACTIVITIES

RELATIONAL

LEAD
- Establish and maintain working relations with project team
- Facilitate teamwork among stakeholders and team members
- Manage crises, identify and address issues and concerns

INFORMATIONAL

PLAN
- Identify project purposes, objectives, and scope
- Lay out project plan

ORGANIZE
- Identify available resources
- Assign resources to products
- Coordinate resource application

MONITOR
- Evaluate project performance
- Identify issues for resolution

CONTROL
- Identify alternative solutions
- Make decisions
- Implement decisions

Functions and Techniques. The techniques and tools associated with each function are rather numerous. Table 19 displays a sampling. Presently the Corps is developing and fielding two very important PM tools, CEFMS and PROMIS, for financial and PM information management respectively.

19. PM FUNCTIONS & TECHNIQUES

RELATIONAL

LEAD
- Team building and team working
- Conflict resolution and management

INFORMATIONAL

PLAN
- Risk assessment and management
- Project Management Plan

ORGANIZE
- Work breakdown structure
- Organization breakdown structure

MONITOR
- Network analysis system
- Earned value analysis

CONTROL
- Project Cooperation Agreement
- Schedule & cost change request

Work and Competence. Looking at project management work in terms of the organization of its activities into functions, roles, and other job-related wholes, helps to develop a clearer picture of abilities required to perform at a level that assures success. Project managers need an abundance of knowledges, skills, and traits for job performance and career advancement. The review in this study yielded well over 100 such elements of ability. They are grouped and sampled in Table 20.

20. PM WORK & COMPETENCIES

RELATIONAL

INTERPERSONAL	INTRAPERSONAL
Knowledges	Knowledges
Org behavior	Self-awareness
Skills	Skills
Assess people	Stress mgmt
Abilities	Abilities
Estab respect	Control ego
Traits	Traits
Honesty	Inner strength

INFORMATIONAL

CONCEPTUAL	TECHNICAL
Knowledges	Knowledges
Project process	Technologies
Skills	Skills
Time mgmt	Planning
Abilities	Abilities
See big picture	Use procedures
Traits	Traits
Common sense	Creativity

COMMUNICATION

RELATIONAL	INFORMATIONAL
Public speaking	Tech writing
Meeting mgmt	Budget writing

As shown in Table 16, these associations of PM work and competencies can be linked to the roles that project managers are expected to perform in the conduct of their jobs. In the next section of this report, the substance of PM work and competence will be explored in the results of a survey of the PM practitioners in the Corps.

PROJECT MANAGEMENT SURVEY

Survey Methods

The survey consisted of face-to-face interviews in selected districts and questionnaires sent to all districts. Project managers and PPMD supervisors participated in the survey.

The survey consisted of face-to-face interviews in five districts and questionnaires mailed to all districts.

INTERVIEWS

Five PPMDs were visited in April and June of 1993, and 39 PMs, branch Chiefs, and DDE(PPM)s were interviewed (Table 21). The subjects of organizations, careers, jobs, skills, and training were explored in open-ended talks lasting about 45 minutes. The interviews provided general background for the study, and helped with preparation and interpretation of the survey questionnaire.

21. DISTRICT PPMDs INTERVIEWED

	PPMD INTERVIEWS		
CORPS DISTRICT	DDE	CHF	PMs
New Orleans	1	1	6
Jacksonville	1	1	11
Mobile	1	1	4
Saint Paul	1	1	4
Seattle	1	1	4
Total	5	5	29

QUESTIONNAIRE

In July of 1993, survey forms were sent to all DDE(PPM)s for distribution to their PPMD supervisors and project managers for completion and return by mail directly to IWR. Of the estimated 350 PPMD employees working in project management, 252, representing all divisions, participated in the survey (Table 22). (Since anonymity was guaranteed, neither names nor districts were elicited from the participants.)

22. PARTICIPATION IN PM SURVEY

CORPS DIVISION	PPMD RESPONDENTS
Lower Miss Valley	29
Missouri River	36
New England	7
North Atlantic	16
North Central	18
North Pacific	25
Ohio River	28
Pacific Ocean	7
South Atlantic	41
South Pacific	13
Southwestern	32
Total	252

The questionnaire, which required 30 minutes to complete in pretests, consisted of over 175 questions about facts and views on PM career development and training. The participants were asked about the work of project management; about the competencies needed to do the work; about the training needed to acquire the competencies; about career planning and management; and, about their jobs and experience in project management (Table 23).

23. TOPICS INCLUDED IN SURVEY

- o Work of Project Management:
  - Activities
  - Roles
- o Competence Needed for Work:
  - KSAs
  - Characteristics
  - Experience
  - Tools & Techniques
- o Training Needed & Received:
  - Kind & Amount
  - Effectiveness
  - Preferences
- o Career Planning/Management:
  - Paths
  - IDPs
  - Opportunities
- o Corps Positions/Experience

Survey Results

All the tables and statistics included in the results reflect responses to the questionnaire; however, interviews are drawn upon to embellish some of these findings.

WORK

Findings regarding the various aspects, functions, roles, and goals of project management work are summarized.

Aspects of PM Work. When asked to assess the basic aspects of PM work, people and technical, 73 percent of the respondents chose the people aspect as the more challenging. On average, respondents indicated that they devoted half of their time to people, another 12 percent to administrative duties, and less than 40 percent to technical work (Table 24).

24. WORK: Fundamental Aspects

ASPECT	TIME DEVOTED	MORE CHALLENGE[1]
People	49%	73%
Technical	39	9
Admin	12	DK
Total	100	82

1/ 18% said equally challenging.

PM Functions. When asked to report on the basic functions of project management (Table 25), the time devoted to each was similar, 15 to 21 percent, but too little time was thought to be devoted to most of them, notably leading and planning, and too much time was devoted to controlling. Once again, the administrative duties were added as the bulk of other work, with 18 percent of total time devoted to them.

25. WORK: Basic PM Functions

FUNCTION	TIME DEVOTED	TIME PROPER[1]
Leading	21%	-20%
Controlling	17	+ 8
Planning	15	-38
Organizing	15	-11
Monitoring	15	-12
Admin	18	DK
Total	100	NA

1/ Too Much Time minus Too Little Time.

Work Roles. When asked to assess the general roles played in work settings (Table 26), leadership surfaced as the role most critical to the success of project management, and one devoted too little time. The management role exhibited a similar pattern. Reinforcing volunteered views on the administrative role, it was thought to get much more time than it deserved. The

supervisory role was seen as the least critical, but devoted about the proper amount of time.

26. WORK: General Roles in Organizations

ROLES	SUCCESS CRITICAL[1]	TIME DEVOTED	TIME PROPER[2]
Leadership	91%	25%	-34%
Management	79	21	-26
Technical	36	12	-14
Administrative	16	30	+73
Supervisory	5	11	- 7
Total	NA	100	NA

1/ Very & Somewhat Critical minus Not Very & Not at All
2/ Too Much Time minus Too Little Time

PM Goals. Asked what project objectives their organizations rewarded (Table 27), respondents agreed most with statements about satisfying the customer and showing political sensitivity. They agreed least with the traditional focus of delivering quality projects on time within budget, although more indicated that these goals were rewarded than not.

27. WORK: Basic Goals of PM

GOAL	REWARDED BY ORG? YES	NOT
Satisfaction	75%	12%
Sensitivity	71	12
Schedule	60	18
Budget	52	20
Quality	51	18

Note: Residual % gave a Neutral response.

Work Summary. People are the challenge of project management. To paraphrase a PM: "Managing projects is managing people in the project process." This applies to leading project teams and to satisfying project customers. Leadership and management are the most critical roles, but administration of budget and schedule controls consumes more time and energy.

"Managing projects is managing people in the project process."

COMPETENCE

The questionnaire was also used to measure facts and views about competencies needed to perform the work of project management.

Basic Abilities. When asked how critical basic KSAs are in their work, respondents put interpersonal abilities and communication, at the top of the list (Table 28). The ability to apply methods and techniques was viewed to be critical, but much less so.

28. COMPETENCE: Abilities

BASIC ABILITY	SUCCESS CRITICAL[1]
Communication	100%
Interpersonal	98
*Intra*personal	88
Conceptual	84
Technical	64

1/ Very & Somewhat Critical minus Not Very & Not at All Critical

Personal Attributes. When asked about the importance of more specific characteristics and skills, respondents gauged interpersonal attributes to be the most critical: honesty and openness, trustworthiness, and respectability rated highest. Conceptual skills came next,

with the ability to synthesize and focus viewed as critical to success. The respondents were asked to rate themselves on some of the skills. They gave themselves high ratings on the more critical skills and low ratings on the less critical ones, including using computers and avoiding biases (Table 29).

29. COMPETENCE: Attributes

ATTRIBUTES	SUCCESS CRITICAL[1]	SELF RATE[2]
Respectability	94%	88%
Trustworthiness	92	90
Being Politic	81	63
Depend Experts	76	81
Avoid Biases	60	57
Using Computers	43	34

1/ Very & Somewhat Critical minus Not Very & Not at All
2/ Percent rating themselves Excellent and Very Good

Functional Experience. When asked what level of technical expertise was needed in several functions to manage projects successfully, the respondents rated engineering, planning and construction the highest, and operations and real estate the lowest (Table 30). It is worth noting that 70 percent were trained as engineers, and 43 percent spent most of their careers in engineering, while 23 percent were in planning.

30. COMPETENCE: Experience

FUNCTION	EXPERTISE NEEDED HIGH	LOW
Engineering	82%	4%
Planning	72	9
Construction	65	4
Real Estate	23	34
Operations	21	28

Note: High includes Very High and Low includes Very Low, Neutral is excluded.

Techniques and Tools. When asked how important it is to be able to use certain techniques and tools in their day-to-day work, respondents said that most of the techniques are important, but only one-third of them were said to be very important by most respondents. People skills in using team building, conflict management, and problem solving were seen to be very important, as were technical skills, including programming, scheduling, and performance measurement (Table 31).

31. COMPETENCE: Techniques

TECHNIQUES & TOOLS	VERY IMPORTANT[1]
TOP ⅓	
Team Building	82%
Programming/Budgeting	73
Conflict Management	71
Problem-Solving	67
Scheduling (NAS)	66
Negotiation	58
Meeting Management	54
Performance Measurement	47
MIDDLE ⅓	
Contingency Planning	43
Forecasting	43
Public Involvement	39
Org Breakdown Structure	35
Quality Control	33
Monitoring & MIS	32
Work Breakdwn Structure	32
Total Quality Mngmt	30
Alternative Dispute Res	27
BOTTOM ⅓	
Costing	24
Counselling	24
Risk Analysis/Mngmt	23
Auditing/Evaluation	10
Trend Analysis	7
Value Engineering	2
Statistical Techniques	2
Geographic Info Systems	1

1/ Percent that answered Very Important.

Most Important KSAs. When asked to list the three to six competencies and personal characteristics most needed for

success in project management, respondents mentioned people skills most often. Six of the eight most mentioned skills, including leadership and team building, were of this type (Table 32). Communication was mentioned more often than any other skill.

32. COMPETENCE: Top KSAs

RANK[1]	COMPETENCE OR CHARACTERISTIC
1	Communication
2	Interpersonal
3	Technical
4	Negotiation, Conflict Mngmt
5	Openness, Honesty and Trust
6	Team Building and Team Work
7	Leadership
8	Planning (Scheduling, etc.)

1/ The order of the frequency of mention.

Competence Summary. The need for technical competence is recognized by those practicing and those supervising project management. Skill is needed in the techniques of project management, and experience is needed in the functions of project development. But, the results leave no doubt that knowledge, skills, abilities, and personal characteristics that contribute to success in leading and managing people are the most important competencies for project managers to have. As one project manager put it: "The most important skills are communication, dealing with people, and knowledge of engineering concepts."

"The most important skills are communication, dealing with people, and knowledge of engineering concepts."

TRAINING

Project managers and their supervisors were asked to provide information about needs for training and about means of satisfying those needs.

Status of Training. When asked if they had enough training to do their jobs effectively, the respondents provided a split decision: About 40 percent agreed that they had enough, but a few more than that said that they had not (Table 33).

33. TRAINING: Enough for Job?

POSITION	AGREE	DISAGREE
Project Manager	36%	45%
Supervisor	56	35
Both Positions	40	44

The respondents were asked to list the courses that they had taken that were the most and the least helpful to them in doing their jobs. The most helpful courses mentioned most often deal with leadership and how the Corps business is run. The four courses mentioned most as being the least helpful are technical courses which were thought to be unrealistic or too narrow in focus (Table 34).

34. TRAINING: Helpful for Job?

RANK[1]	MOST HELPFUL COURSES TAKEN
1	CW Program Devel & Execution
2	LEAD Training
3	Project Management Overview
4	Scheduling, NAS
5	AE Contracting & Negotiation
6	Total Quality Management
7	Human Resources Management
8	Organizational Behavior

	LEAST HELPFUL	WHY?
1	CW and Mil PM	Not Real
2	NAS Software	Not Used
3	Risk Analysis	Not Used
4	Basic PM (355)	Too "CW"

1/ The order of the frequency of mention.

Subjects of Training. When asked in what subjects they needed more training, the respondents mentioned training in people skills most often. Eight of the top 12 needs are people skills, including team building, conflict management, and leadership (Table 35).

35. TRAINING: Subjects Lacking

RANK[1]	SUBJECTS IN NEED OF TRAINING
1	Team Building
2	Contracting
3	Conflict Management
4	Leadership
5	Human Resources Management
6	Negotiation
7	Program Management
8	Advanced Project Management
9	Interpersonal Relations
10	Communication
11	Public Relations
12	Scheduling, NAS

1/ The order of the frequency mentioned.

The respondents also were asked if there were training needs that were being ignored by the Corps. Again, subjects dealing with the interpersonal aspects of project management were mentioned most often. Relations with sponsors and publics floated to the top of the list (Table 36).

36. TRAINING: Subjects Ignored

RANK[1]	SUBJECTS IGNORED IN TRAINING
1	Local Sponsor Relations
2	Public Relations
3	Total Quality Management
4	Briefing, Communications
5	Leadership
6	People Skills
7	NAS, Critical Path Method
8	Federal and Corps Policies

1/ The order of the frequency mentioned.

When asked to provide the three to five subjects most important for the performance of project management jobs, the respondents said that learning how to deal with people was most important. They also put the techniques of scheduling and budgeting among the top eight subjects (Table 37).

37. TRAINING: Subjects Needed

RANK[1]	SUBJECTS MOST CRITICAL TO PM
1	Interpersonal (People)
2	Scheduling, Planning
3	Communication
4	Leadership
5	Negotiation, Conflict Resolu
6	Program Mgmt, Budgeting
7	Technical/Functional
8	Team Building

1/ The order of the frequency mentioned.

Strategy for Training. Facts and views on how to satisfy training needs were gathered. Respondents were asked to rank the basic ways of acquiring the competencies needed to perform their jobs. They placed work assignments at the top, and self-development at the bottom (Table 38).

38. TRAINING: How to Obtain

METHOD	RELATIVE RANKING BEST	2ND	3RD
Work Assignments	78%	13%	8%
Formal Classroom	15	54	30
Self-Development	6	35	58

Respondents were asked how well a career in a technical function, like engineering or planning, prepares one to be a successful project manager. While the majority thought that such experience prepared one well, 25 percent disagreed and said that technical careers prepared one poorly for project management (Table 39).

39. TRAINING: Value of Careers

How well would you say a career in a Corps technical field prepares an individual to be a successful project manager in PPMD?

Very Well	26%
Well	48
Poorly	22
Very Poorly	3

Asked about possibilities and preferences for training, most respondents said that they prefer and can afford to train once or twice a year for about a week at a central place away from the office (Table 40).

"PM training needs to emphasize people and communication skills, and include the corporate picture, management tools, program requirements, and technical processes."

40. TRAINING: How, When, Where

	PERCENT[1]
AFFORD TO BE AWAY?	
One Week Trips	38%
Two Weeks	33
More and Less	25
TRAINING PER YEAR?	
Up to One Week	18%
One to Two	56
Two to Four	21
SESSIONS PER YEAR?	
One Long Class	11%
A Few Short	74
No Preference	13
LOCATION TO TRAIN?	
At My District	25%
A Central Site	56
No Preference	16

1/ Do not sum to 100% as not all answered.

Training Summary. The results suggest that project managers and their PPMD supervisors are undertrained. They have not had enough training, and some they have taken has not been helpful. They especially need more training in managing and leading people, and better training in the procedures and techniques of managing Corps projects. They recognize the value of learning on the job, want formal training supported by management, but put little stock in any self-development. Their needs and expectations for training are very high (as the paraphrase above suggests).

CAREERS

The questionnaire also was used to gather facts and views about careers in the field of project management. Respondents were asked about project management career paths and possibilities, and about their career plans and progress.

Career Advancement. The goals of development and training are performance and advancement (Chapter 1). Training improves job performance by enhancing competence to do the job. But other factors contribute to performance. When respondents were asked to rank the major determinants of performance, competence came in second after motivation (Table 41). This underscores the importance of facts and views about careers in project management, since the prospect of advancement is a major source of motivation. Lacking opportunities, job performance may suffer despite development and training.

41. CAREERS: Job Performance

FACTOR	RELATIVE EFFECTS MOST	2ND	3RD
Motivation	56%	33%	10%
Competence	43	49	7
Facilitation	8	14	77

Career Aspirations. When asked if they had career plans, and what jobs they aspired to hold, less than three-quarters of the respondents claimed to have an Individual Development Plan, but most who did, aspired to advance within the project management career (Table 42).

42. CAREERS: Plans & Targets

	EMPLOYEES
WITH A CAREER PLAN	72%
JOB ASPIRE TO HOLD[1]	
DDE(PPM), Chief	39%
PPMD Supervisor	37
Technical Chief	36
Project Manager	15
Higher Echelons	14

1/ Career job targets add to over 100%, as more than one is possible in career plans.

Career Opportunities. Several questions were asked to plumb the perceptions of respondents about their futures in the PPM career. Asked if they could advance to DDE(PPM) without leaving their PPMD, 29 percent said yes and an equal number said no, but 38 percent didn't know. Asked if they knew how to advance to the next rung on their career ladder, 62 percent agreed. And asked if promotion from the PPMD to a technical division was possible, 28 percent agreed that it was for project managers, and 37 percent said it was for a PPMD supervisor (Table 43).

When respondents were asked to rank the major determinants of performance, competence came in second after motivation. This underscores the importance of facts and views about careers in project management, since the prospect of advancement is a major source of motivation. Lacking opportunities, job performance may suffer despite development and training.

43. CAREERS: Opportunities

		YES	DK	NO
My PPMD has career path to its DDE		29%	38%	29%
		AGR	NEU	DIS
I know how to advance in my career		62%	18%	19%
Can be promoted to positions in technical div's	Project Managers	28%	29%	42%
	PPMD Supervisors	37%	31%	31%

Professional Certification. When asked if a certification program would improve project management in the Corps, two-thirds of the respondents said that it would. Forty percent believed that it would improve performance, and 25 percent thought that the only benefit would be more stature. Most of the respondents rejected it as a criterion for promotion of project managers, although 25 percent said that it should be used. In the event that such a program is begun, most of the respondents prefer that it be developed outside of the Corps (Table 44).

44. CAREERS: Certification

BENEFITS	YES	CUM	SUM[1]
Stature	25%	25%	62%
Performance	3	28	40
Both	37	65	37
Neither	33	98	33
PROMOTION	**YES**	**DK**	**NO**
Criterion?	25%	28%	45%
DEVELOPED	**COE**	**OUT**	**NP[2]**
Who/where?	28%	44%	23%

1/ Sum of inclusive benefit categories.
2/ No Preference.

Career Progress. Respondents were asked to report their positions and grades now (at the time of the survey) and before they joined PPMD. Most of them did, and indicated that they had advanced in their jobs and careers (Table 45). To be expected, nearly three times as many were project managers in their PPMD jobs; about the same number were supervisors; and, just one-tenth who were staff remained so. Advancement in pay grade was similar. Nearly a third moved up to or beyond the grade 13 mark. In all, the transition was very positive.

45. CAREERS: Progress

POSITION	PPMD	PREV	DIFF
Project Manager	70%	24%	46%
Supervisor	21%	23%	- 2
Staff	2	20	-18
PAY GRADE			
Less than 13	27%	53%	-26%
GM/GS 13	51	28	23
More than 13	18	13	5

And, when asked about their job satisfaction in PPMD, the vast majority were satisfied, but most were "somewhat satisfied", and 13 percent were "not very satisfied" (Table 46).

46. CAREERS: Job Satisfaction

Overall, how satisfied are you with your job?

	PMs	CHs	ALL
Very	26%	53%	32%
Somewhat	58	42	53
Not Very	14	2	13

Respondent Backgrounds. A few questions were asked to gauge the training and experience the respondents brought to their new jobs in PPMD (Table 47). Nearly 80 percent indicated

that they had more than 10 years of service with the Corps. Most of these careers had been developed in the engineering division, but a large number had spent most of their careers in planning. The majority called engineering their field of training, and over 40 percent had advanced degrees.

47. CAREERS:	**Preparation**
YEARS SERVE CORPS	
Less than 2	3%
Between 2 and 10	17
More than 10	79
MOST CAREER SPENT	
Project Management	11%
Programs	6
Planning	23
Engineering	43
Construction	12
Operations	3
FIELD OF TRAINING	
Business	1%
Science[1]	12
Engineering	70
HIGHEST EDUCATION	
Less than Bachelors	2%
Bachelors Degree	55
More than Bachelors	41

1/ Included are economics, geography, hydrology, and environmental science.

Careers Summary. Respondents say that motivation contributes more to performance than does competence. Fortunately, most like their jobs, and work hard at doing them. Perhaps because they don't see much opportunity for promotion, they are not taking complete advantage of career planning and management opportunities. These project managers and supervisors *are* experienced and successful engineers and scientists. Most of them want more success, rewards for job performance and chances for career advancement. They're only somewhat satisfied with their jobs; they feel abandoned along their dead-end career path; and, they seem ambivalent about embracing their newfound profession. What will sustain them, and, in turn, keep the project management enterprise afloat?

"I really like the job, the field of project management. I wish the grade structure would allow Senior PMs to move to [grade] 14. It is a dead-end career, not encouraging unless you really like what you're doing."

STRATEGY AND PLAN DEVELOPMENT

During the Fall and Winter of 1993, a strategy for satisfying the project management career development and training needs was developed. This effort was undertaken with the help of the Training Advisory Panel (TAP) appointed for this study, and in close coordination with the HQUSACE proponents of project management (Chapter 1, Table 1). The procedures and results of that effort are summarized in this chapter of the report.

48. WORKSHOPS AND BRIEFINGS

WORKSHOPS
Oct93 o review needs assessment
o strategy considerations
Dec93 o "advanced course" needs
o strategy recommendation
Feb94 o "advanced course" tasks
o career development plan
Apr94 o "advanced course" tasks
o career development plan
BRIEFINGS
Sep93 o needs assessment survey
o preliminary conclusions
Nov93 o essential career issues
o "strategy" implications
Dec93 o 4 strategy alternatives
o general recommendations
Jan94 o overview for the PM-MAT [Management Action Team]

PROCEDURES

Strategy development entailed consideration of measures for improving the existing approach to satisfying needs. The basic procedure followed by IWR was to document problems with its research, formulate tentative solutions, deliberate possible strategies with its advisors, and brief recommendations to the HQUSACE proponents. After four meetings with its advisors and a like number of briefings (Table 48), the basic elements of a strategy emerged.

This effort was undertaken with the help of the Training Advisory Panel, and in close coordination with the HQUSACE proponents of project management.

This process was slowed by the introduction in January 1994 of the task of providing the Corps with an "advanced course" for project managers, and by the extension of the strategy task to include the development of a career development and training *plan* responsive to the needs of project management. That plan will be introduced later in this chapter. The plan and the "advanced course" are covered in detail elsewhere (Table 4 lists the reports).

Additional Research

Most of the information forming the basis of general strategy development is drawn from the study of ESRC career policy and practice (Chapter 1) and from the survey of field facts and views regarding these matters (Chapter 2). However, when the need or opportunity arose, IWR undertook limited efforts to obtain additional information.

STRATEGY SURVEY

At the conclusion of the IWR study of career development and training needs, several general observations were made about PM careers and training in the Corps (Table 49 and 50). Later these statements were used to measure opinions of members of the TAP, of DDE(PPM)s, and of other practitioners of PM in the Corps.[3]

49. OBSERVATIONS ON PM CAREERS

1. In keeping with the NPR, it is time to encourage more of a customer focus and empower our PMs to serve those customers better. [1] Rank order of level of agreement with statement.

2. PM is a recognized field of study and endeavor, and a maturing professional career, but in the Corps it is an isolated job in a tentative career. [10]

3. A fuller complement of PM positions should be added to the structure, allowing a dual ladder career and a division of labor along basic roles. [17]

4. Selection for positions should be open to all, but made on the basis of actual or potential competency in each of the focal roles performed in the career path. [7]

5. Intern level positions should be open to new graduates from both business and engineering school programs in PM that are recognized or accredited (by PMI). [13]

6. The PM enterprise should be the training ground for managers in the Corps, feeding its surplus to the technical divisions, not the opposite pathway. [16]

7. Certification by PMI or other organization should be encouraged to further the institutionalization of PM as a separate and viable career in the Corps. [15]

Methods. Questionnaires with the statements and Likert-type scales (asking about agreement) were used. The TAP was asked to complete the survey at its first workshop, both before and after discussing each of the observations. The other groups received and returned their questionnaires by fax or mail. In addition to DDE(PPM)s and PPM Directors at MSCs, PMs in the Civil Works branch of the Louisville PPMD participated.

50. OBSERVATIONS ON TRAINING

8. Competence is a necessary, but not a sufficient condition, for successful PM; PMs must be motivated and facilitated by their organizations. [6]

9. Both the relational (people) and informational (process) aspects of PM are integral to its structure and function and critical to its success. [2]

10. The present stock of PMs is better prepared to succeed at implementing the technical and conceptual procedures than the interpersonal relationships. [9]

11. Many PMs have a scant view of the corporate aspect of Corps business, and lack knowledge and skill needed to manage some policy and planning matters. [11]

12. Possibilities for gaining PM competence through work assignments is very limited in the Corps, other divisions lack the proper project perspective. [12]

13. Selective internships & developmental assignments to higher echelons for the purpose of learning about the business of the Corps should be offered. [5]

14. PMs should be encouraged to acquire certification and assisted through the provision of time and money to implement individual self-development plans. [8]

15. Self-development plans should contain a balance of independent study and classes offered by government agencies and educational institutions. [4]

16. Corps provided classroom training should be limited to the goals of providing knowledge about Corps policies and procedures and of acquiring skill in Corps techniques and tools. [14]

17. Networking facilitated by regular gatherings and other mechanisms should be encouraged to foster learning and community among PMs. [3]

Results. Analysis of the data gathered in these three surveys yields results 1) focusing on levels of agreement with the 17 observations, 2) contrasting before and after discussion levels for the TAP members, 3) comparing career and training observations, 4) contrasting levels of agreement among the three groups, and 5) focusing on some of the observations.

The levels of agreement with the observations for each group of respondents are summarized in Table 51. Agreement with the observations is generally high, majorities of each group agree with most of them. TAP members exhibited the highest levels of agreement, followed by PMs, and then by DDEs. The rank orders of agreement with the observations for the three groups are fairly close. Among the top-5 observations, orders and levels of agreement among the groups are very close.

51. RESULTS BY AGREEMENT LEVEL

ITEM	TAP[1] COLD	TAP[2] POST	TAP[3] DIFF	DDE[4] PPM	ORL[5] PPMD
Top-5 Observations					
1	100%[6]	100%	0%	100%	100%
9	100	100	0	100	100
17	100	100	0	91	83
15	100	100	0	88	50
13	100	100	0	85	100
Mean	100	100	0	93	87
Mid-7 Observations					
8	72	100	+28	84	83
4	100	100	0	75	100
14	86	100	+14	70	67
10	72	100	+28	48	50
2	86	100	+14	45	50
11	100	100	0	37	67
12	71	100	+29	37	50
Mean	84	100	+16	57	67
Low-5 Observations					
5	71	86	+15	32	50
16	58	85	+27	24	33
7	86	72	-14	61	50
6	43	72	+29	18	50
3	57	57	0	51	67
Mean	63	74	+11	37	50
All Observations					
Mean	83	93	+10	62	68

1/ TAP response prior to their discussion.
2/ TAP response after workshop discussion.
3/ Difference between TAP prior and after.
4/ DDE(PPM) and MSC PPM Director response.
5/ Chief and PMs in CW Branch of ORL PPMD.
6/ Respondents agreeing with observations.

Discussion of the observations among the TAP members resulted in an increase in their overall agreement. Eight of the ten levels of agreement that could increase did increase. Item 3 advocating more positions in PPMDs did not change, and item 7 advocating certification lost a supporter.

The levels of agreement with the observations are displayed by subject in Table 52. There is generally more agreement with the training observations than with those pertaining to careers. While the PMs agreed with them equally, the others did not, favoring the training observations by a fair margin. The increase in agreement with training observations doubled that induced by the TAP member discussion for observations on careers.

52. RESULTS BY GENERAL SUBJECT

ITEM	TAP[1] COLD	TAP[2] POST	TAP[3] DIFF	DDE[4] PPM	ORL[5] PPMD
Career Observations					
1	100%[6]	100%	0%	100%	100%
4	100	100	0	75	100
2	86	100	+14	45	50
5	71	86	+15	32	50
7	86	72	-14	61	50
6	43	72	+29	18	50
3	57	57	0	51	67
Mean	78	84	+ 6	55	67
Training Observations					
9	100	100	0	100	100
17	100	100	0	91	83
15	100	100	0	88	50
13	100	100	0	85	100
8	72	100	+28	84	83
14	86	100	+14	70	67
10	72	100	+28	48	50
11	100	100	0	37	67
12	71	100	+29	37	50
16	58	85	+27	24	33
Mean	86	99	+13	66	68
All Observations					
Mean	83	93	+10	62	68

1/ TAP response prior to their discussion.
2/ TAP response after workshop discussion.
3/ Difference between TAP prior and after.
4/ DDE(PPM) and MSC PPM Director response.
5/ Chief and PMs in CW Branch of ORL PPMD.
6/ Respondents agreeing with observations.

The relationship between level of agreement and the subject of the observations is summarized in Table 53. The percent of training observations in the top-5 bracket of agreement is nearly three times that for careers. And, the percent of career observations in the low-5 bracket is nearly six times that for training. Respondents clearly found agreement with the career observations more difficult, especially the TAP members and the DDEs (Table 51 and 52).

53. AGREEMENT LEVEL BY SUBJECT

SUBJECT OF STATEMENTS	CATEGORY OF AGREEMENT[1] LOW-5	MID-7	TOP-5	ALL
Careers	57%	29%	14%	100%
Training	10%	50%	40%	100%

1/ Statements divided into three groups by levels of agreement reflected in Table 51.

Four of the top-5 observations are on training, and only one of them received a moderate level of agreement by a group: Fifty percent of the PMs did not agree with item 15 which advocates independent study in self-development plans (Table 51). Four of the low-5 deal with careers. While agreement in this bracket is still high for TAP members, it is only half as high for the DDEs and two-thirds as high for the PMs (Table 51).

Discussion of the observations among the TAP members resulted in an increase in their overall agreement.

54. TOP-5 AND LOW-5 STATEMENTS

Top-5 Observation

1. In keeping with the NPR, it is time to encourage more of a customer focus and empower our PMs to serve those customers better. [1] Rank order of level of agreement with statement.

9. Both the relational (people) and informational (process) aspects of PM are integral to its structure and function and critical to its success. [2]

17. Networking facilitated by regular gatherings and other mechanisms should be encouraged to foster learning and community among PMs. [3]

15. Self-development plans should contain a balance of independent study and classes offered by government agencies and educational institutions. [4]

13. Selective internships & developmental assignments to higher echelons for the purpose of learning about the business of the Corps should be offered. [5]

Low-5 Observations

5. Intern level positions should be open to new graduates from both business and engineering school programs in PM that are recognized or accredited (by PMI). [13]

16. Corps provided classroom training should be limited to the goals of providing knowledge about Corps policies and procedures and of acquiring skill in Corps techniques and tools. [14]

7. Certification by PMI or other organization should be encouraged to further the institutionalization of PM as a separate and viable career in the Corps. [15]

6. The PM enterprise should be the training ground for managers in the Corps, feeding its surplus to the technical divisions, not the opposite pathway. [16]

3. A fuller complement of PM positions should be added to the structure, allowing a dual ladder career and a division of labor along basic roles. [17]

The observations in the top-5 and low-5 brackets of agreement are displayed in Table 54. At the bottom of the low-5 is the observation advocating the addition of PPMD positions and a dual ladder career (item 3). The TAP members deemed this to be infeasible, due to the lack of FTEs. Not surprisingly, the greatest agreement came from the PMs (Table 51). Prior to their discussion, TAP members

agreed least of all with item 6 advocating PM as the source of managers in the Corps (albeit discussion served to raise it substantially). The DDEs also put this career observation at the bottom of their order of agreement (Table 51). Another bottom dweller for TAP members is item 16 advocating limits on in-house classroom training. Both of the other groups show very low levels of agreement with this observation. After discussion and clarification, the number of TAP members in agreement with this increased substantially (Table 51). The other two observations sharing the low-5 bracket both concern broadening PM in the Corps: Item 5 advocates the hiring of business school trained PMs as Interns, and item 7 suggests that certification be used to shore up the PM career in the Corps. The TAP members agreed with these two ideas, as did majorities of the others, with one exception: Only one-third of the DDEs agreed with hiring business school graduates (Table 51).

PPM CONFERENCE

On the recommendation of TAP members, additional interviews with practitioners of PM were conducted at the Programs and Project Management Conference in early November 1993. Eight of the conference attendees volunteered to be interviewed during this impromptu survey. The information and insights gained at the conference were added to the previous survey results, and drawn upon in the development of the strategy.

Review of Findings

To synthesize the information on which the strategy and the plan for career development and training are based, the results and implications of this study will be summarized by providing answers to the general research questions introduced in Chapter 1 (reproduced in Table 55).

55. GENERAL RESEARCH QUESTIONS

1. Is fitting the PPM function into the ESRC career program as the fifth project development and operations function likely to satisfy most of the career development and training needs of project managers?

2. Is PPM sufficiently like the other project development and operations functions to make their common treatment in the ESRC career program and plans a viable strategy for satisfying the needs of its PMs?

3. Are the career development and training needs of project managers sufficiently like the needs of technical staff and line managers to prescribe for them the same career ladder and very similar plans?

4. What is the work of project management and what are the competencies needed for job performance and advancement? What are its key functions and roles, what is their relative importance?

5. Are project managers trained and developed adequately to do their jobs? Are IDPs used to assure that the right training is obtained at the right time? What competencies are lacking?

6. Is there a viable career path for project managers? Is there an adequate source of project managers? Are there adequate opportunities for project managers to advance?

7. What is the general status of project management in the United States as a field of study and professional career? Is the Corps taking advantage of this state-of-the-practice?

8. What is the (potential) role of professional certification of project managers? How does it contribute to development and training? How does it contribute to job performance and career advancement?

These questions are related and interdependent. For example, questions 5 and 6, on training and careers, depend on 1, 2 and 3, on the ESRC career program,

which depend on 4, 7 and 8, on the field and the profession, especially on question 4 about the work of project management.

WORK AND COMPETENCE

> 4. What is the work of project management and what are the competencies needed for job performance and advancement? What are its key functions and roles, what is their relative importance?

Project management is just one of three kinds of management performed in the Corps, the other two are general and functional. All three need to be considered to understand any of them. Most management has three aspects: *tasks*, or what is being managed; *roles*, or how it is being managed; and, *jobs*, or who is managing it (Table 56). These jobs, tasks, and roles combine to define the basic kinds of management in the Corps.

56. 3 DIMENSIONS OF MANAGEMENT

TASKS	ROLES	JOBS
Enterprise (business)	Leadership	General Manager
Production (process)	Management (direction)	Project Manager
Resources (people)	Adminis-trative	Technical Manager
Technology (knowhow)	Supervisory Technical	Functional Manager

General Management. In this basic kind of management, the task of managing the business enterprise is performed by the general managers, who draw primarily upon the leadership and management roles to lead their business organizations.

Project Management. In this basic kind of management, the task of managing the production process is performed by the project and the technical (or product) managers, who draw primarily upon the leadership, management, and administrative roles to manage the work of their organizations (Table 57).

Functional Management. In this basic kind of management, the tasks of managing the resources and technology are performed by the functional managers, who draw mostly upon the technical, supervisory and administrative roles to supervise the people in their organizations.

57. PROJECT MANAGEMENT DEFINED

TASKS	ROLES	JOBS
Enterprise (business)	**Leadership**	General Manager
Production (process)	**Management (direction)**	**Project Manager**
Resources (people)	**Adminis-trative**	**Technical Manager**
Technology (knowhow)	Supervisory Technical	Functional Manager

While each job and each task requires playing all of the management roles, each job has its specialty based upon what part of overall management it exists to perform. In general, general managers exist to lead their organizations, project and product managers exist to manage the work, and functional managers exist to supervise the people. This fits the matrix structure of work organization, where functional management is responsible for the vertical dimension, project management is responsible for the cross-

cutting horizontal dimension, and general management is given responsibility for the entire organization.

The key difference relevant to question 4 is that the project manager needs to be able to lead project teams responsible for managing the horizontal process of production, while the functional manager needs to be able to supervise people responsible for applying the special knowhow of a technical division of the organization. The project manager is a leader who specializes in production, and the functional manager is a supervisor who specializes in technology.

Given the definition of project management and the difference between it and other kinds of management, what are the major implications for a strategy and plan for career development and training? To address this, the first three research questions will be examined.

ESRC CAREER PROGRAM

1. Is fitting the PPM function into the ESRC career program as the fifth project development and operations function likely to satisfy most of the career development and training needs of project managers?

2. Is PPM sufficiently like the other project development and operations functions to make their common treatment in the ESRC career program and plans a viable strategy for satisfying the needs of its PMs?

3. Are the career development and training needs of project managers sufficiently like the needs of technical staff and line managers to prescribe for them the same career ladder and very similar plans?

Another Technical Function? While project management is a project development function, like planning, engineering and construction, unlike them it is not a technical function, it is a management function. Fitting it into the ESRC career program parallel to these functions is not appropriate. The program and plans for these functions are best suited for technical staff and line managers, not for project managers. While project managers need to be technology generalists, their work does not require them to be technical specialists nor their supervisors.

Technical Staff and Managers? The ESRC career program treats project managers as technical staff, who like other technical staff need only to be developed and trained for job performance and career advancement (which means line management). This may be effective for the other fields, but it is not a good strategy for project managers. While technical staff come to their jobs educated and trained to perform their basic duties (as engineers, economists, and other scientists), very few of them come prepared to manage projects. Treating prospective project managers as technical staff anticipating advancement to line management, will not prepare them soon enough nor well enough to be excellent performing project managers.

To examine these and related ideas further, the effects of this errant strategy on the current stock of project managers in the Corps will be examined by reviewing research questions 5 and 6.

TRAINING AND CAREERS

5. Are project managers trained and developed adequately to do their jobs? Are IDPs used to assure that the right training is obtained at the right time? What competencies are lacking?

6. Is there a viable career path for project managers? Is there an adequate source of project managers? Are there adequate opportunities for project managers to advance?

Enough Training? Nearly one-half of the Corps project managers surveyed by IWR said they did not have enough training to do their jobs effectively (Table 33), and about one-quarter of them were not using IDPs in the planning and management of their career development and training (Table 42). Training felt to be needed the most included dealing with people (teamwork and leadership), and managing the process (scheduling and budgeting) (Tables 35, 36 and 37).

Adequate Source of Corps PMs? Almost 80 percent of the PMs had worked for the Corps over ten years when they completed the survey, and they had spent most of their careers in the project development functions (Table 47). Nearly one-half of them had been supervisors or "project managers" in those functions (Table 45). About 70 percent of them were trained as engineers, and over 40 percent had advanced degrees (Table 47). For the most part, Corps project managers of today are "senior career engineers". Neither their educations nor their training have prepared them adequately to be highly effective project managers.

The source of project managers was not adequate when project management was started in the Corps, nor is it likely to be in the future, given the past and present strategy used for development and training of engineers and scientists for project development careers, including project management.

Viable Career Path? There is no career path in the Corps for project managers. The career ladder for project development functions ignores the project manager, the key positions are technical staff and line management positions (mostly the latter). Neither of these positions serve to develop the special abilities needed for project management. Staff positions in project management would, but project management divisions have few, if any, of them. The job in planning, engineering, and construction that could serve as a good stepping stone to project manager is technical (or product) manager, but they too are ignored in the ladder and plans.

Opportunities for PMs? While the opportunities for project managers to be promoted are limited, this may be less of a problem down the road than it is today. Most of the present project managers are "senior career engineers". Many took the job for the advancement that it actually was (26%) or that it might potentially be (Table 45). These engineers aspire to be function chiefs (Table 42), and most will be frustrated for there are few real opportunities. But, as the pool of project managers

grows younger, this will be a smaller problem for fewer project managers.

Two Obstacles to Advancement. If not for the present pool of project managers (crowded with "senior career engineers"), the opportunities for advancement for future pools (less affected by this startup phenomenon) need to be more adequate. But two obstacles stand in the way of this: Project managers report that promotion to jobs outside of project management is not very likely (Table 43). They believe that they will not be selected over loyal staff and managers in the functions with vacancies. There is anecdotal evidence that this is true. A related problem is that only about one-half of the PPMDs have branch chiefs, which is the rung of the career ladder above project manager. This means there are no jobs in these PPMDs for the PMs to advance to. And, because of the crossover problem (noted above) there is no pathway to the DDE(PPM) position for them. While relocation to another PPMD (with the position) is possible, it is not a normal part of career advancement in the Corps.

"It is a dead-end career, not encouraging unless you really like what you're doing."

If the condition of PM career development and training in the Corps is lacking, what does it look like outside of the Corps? Are there any opportunities for improving the state of PM in the Corps? An examination of questions 7 and 8 will provide some insights.

FIELD AND PROFESSION

7. What is the general status of project management in the United States as a field of study and professional career? Is the Corps taking advantage of this state-of-the-practice?

8. What is the (potential) role of professional certification of project managers? How does it contribute to development and training? How does it contribute to job performance and career advancement?

Status of Project Management. Project management is a fast growing profession in the U.S. and elsewhere, driven by many product and service industries in need of better ways to stay responsive and competitive in a new global economy with many rapidly changing technologies. Compared to the private sector and some government agencies, the Corps has been slow to take advantage of the opportunities this represents. For example, the IWR survey found that most Corps PMs think certification would be beneficial (Table 44), but only a very few have become certified.

PM Professional Organization. PMI, the Project Management Institute, has emerged as the national authority on project management, leading PM in the 1) standardization of its body of knowledge, 2) accreditation of its programs of education, and 3) certification of its practicing professionals. The status of its efforts and an indication of the condition of

the profession as of 1993 are reflected in Table 58.

58. INDICATIONS OF PMI STATUS[1]

MEMBERSHIP:
- Growth rate of 14 percent
- Total members over 10,000
- Over 1,400 attend seminar
- Chapters @ 67 and growing

CERTIFICATION:
- Over 3,500 people applied
- Over 1,700 certified PMPs

ACCREDITATION:
- Degree programs exceed 14
- PMI accredited 2 programs

STANDARDS:
- Body of Knowledge will be entirely revised for 1994

1/ as of October 1993

Opportunities for the Corps. The field and profession of project management is strong and growing stronger. This presents the Corps with a number of opportunities for improving its condition and practice. One is the simple recognition of the field and profession: It is a kind of business management with its own body of knowledge and a rapidly growing population of practicing professionals who apply their skills to a wide range of technologies. If the Corps is going to use project management, it needs to join the profession and become one of its leaders.

Certification of Corps PMs. Another opportunity applies directly to the Corps project managers: Becoming a Project Management Professional, PMP. Engineers who aspire to be technical leaders become PEs, Professional Engineers. Corps planners, designers, builders, and others who aspire to be project managers, need to become PMPs. The value is twofold: First, *having* the title will bring recognition inside and outside the Corps, and will yield opportunities for positions and projects.

Second, *getting* the title is an excellent way to prepare for a project manager job and career. The PMP certification requires learning the project management body of knowledge (PMBOK), and it also requires participation in the field and profession. Learning the PMBOK can be achieved in a number of ways, ranging from reading PMI's publications, to taking one of the growing number of programs yielding a masters certificate or masters degree. This self-development process will take personal time and money, but will yield knowledge and skills that are not available through the current development and training program.

THE STRATEGY

A metaphor was borrowed to describe and prescribe career development and training for PM: *Growing project managers.*

Summary of Conditions

The present stock of project managers was grown in the technical functions of Corps project development (planning, engineering, and construction) using the ESRC career program and ACTEDS plans for those functions. As a result, they tend to be half-grown, since the ACTEDS plans were designed to grow technical staff and

function (line) managers. The PMs were cultivated for the technical and supervisory roles, more than for the leadership and management roles needed for project management's team and process focus.

The career development and training plan added to ACTEDS for the project management function is the same as its technical kin, and will not grow better future crops nor adequately cultivate today's PMs, as line management remains the primary emphasis. Only the technical functions have jobs at all levels of career development, and allow the crops of technical staff and line managers to be home-grown. The PM function must transplant from these farm-grown crops, as it lacks its own growing fields.

Alternative Strategies

The alternative strategies for improving the current situation and for growing better project managers derive from two key factors: growing fields and growing methods. Changes can be made in the fields, in the methods, or in both. The four strategies shown in Table 59 were considered.

59. 4 ALTERNATIVE STRATEGIES

GROWING FIELD CHANGED	GROWING METHOD CHANGED: No Changes	GROWING METHOD CHANGED: New PM CDP
No Changes	HALF-GROWN	FARM-GROWN
New PM Job	HOME-GROWN	FULL-GROWN

STRATEGY DESCRIPTION

Half-grown Strategy. This is the "no change" alternative. The Corps would continue to grow technical staff and line managers in the four technical functions using the existing ESRC program and ACTEDS plans and would transplant them as needed to the PM function as project managers. These half-grown, transplanted PMs would continue to be cultivated in the PM function using its existing ACTEDS plan.

Home-grown Strategy. In this strategy, new jobs are added to the PM function to complete the levels of career development, forming the field needed for home-growing PMs using the existing ACTEDS plan. This and the half-grown alternative are stove-piping strategies, they depend upon functional plans and fields to grow PMs in the traditional stovepipe manner (Table 60).

60. 2 STOVE-PIPING STRATEGIES

HALF-GROWN WAY Jobs/CDPs Same	PM	PL	EN	CO	OP
	FM	FM	FM	FM	FM
	PM	FM	FM	FM	FM
		TS	TS	TS	TS
		TI	TI	TI	TI

HOME-GROWN WAY Add Jobs to PM	PM	PL	EN	CO	OP
	FM	FM	FM	FM	FM
	PM	FM	FM	FM	FM
	TS	TS	TS	TS	TS
	TI	TI	TI	TI	TI

PL=Planning
EN=Engineering
CO=Construction
OP=Operations

FM=Function Manager
PM=Project Manager
TS=Technical Staff
TI=Technical Intern

Farm-grown Strategy. In the previous two alternatives, the methods, or career development and training plans (CDPs), did

not change, but the field, or place for growing PMs, shifted to an extended PM function in the home-grown strategy. In the farm-grown strategy, a new CDP (to be described later) is used in all of the ESRC functions, especially in the technical functions, to grow better PMs.

Full-grown Strategy. This is the alternative where the added jobs *and* the new plan are used. It is an extension of the farm-grown strategy, in that the PM function is added to the farm, providing an additional field for growing the PMs. A special feature of these two farm-grown strategies is that the new CDP applies not only to PMs but to technical managers (TMs) also. The farm-grown and full-grown alternatives are pipe-lining strategies, the new CDP uses a horizontal flow of development across the functions rather than the traditional vertical flow of stovepipes (Table 61).

61. 2 PIPE-LINING STRATEGIES

FARM-GROWN WAY PM CDP for All	FULL-GROWN WAY New CDP & Jobs
PM PL EN CO OP	PM PL EN CO OP
FM FM FM FM FM	FM FM FM FM FM
PM FM FM FM FM	PM FM FM FM FM
TM TM TM TM	PM TM TM TM TM
TS TS TS TS	TS TS TS TS TS
TI TI TI TI	TI TI TI TI TI
PL=Planning EN=Engineering CO=Construction OP=Operations	FM=Function Manager TM=Technical Manager TS=Technical Staff TI=Technical Intern

STRATEGY ASSESSMENT

Half-grown Strategy. The Corps needs to improve its PM career development and training, and continuation of this existing half-grown strategy limits its opportunities. A new strategy which does not perpetuate the current problems is needed (see Summary of Conditions above).

Home-grown Strategy. Filling in the remaining levels of PM career development by adding more positions to the function is not a viable strategy in light of the Administration's current goal of downsizing the government. While the needed positions could be obtained from other functions, this is not likely to be an acceptable approach given the prevailing climate in the Corps. Beside these problems, this strategy is not advisable: It retains the worse part of the current strategy--the method of stove-piping, while it discards the best part--the use of technical functions as fields for growing PMs.

Farm-grown Strategy. This is the half-grown strategy with its stove-piping replaced by the new pipe-lining method of growing PMs. Pipe-lining with a special CDP for TMs and PMs assures that the twin goals of growing technology generalists and management specialists are achievable. The present pool of PMs is half-grown in both respects. Their experience in the technical functions is too narrow, and their expertise in product and project (process) management is too shallow. By pipe-lining across the fields of the technical functions, a

general knowledge of each of the project technologies is gained, while the prospective PM is cultivated as an expert in process management. Working as a TM in each function is especially valuable in meeting these twin goals. Farm-growing TMs and PMs with the pipe-lining method (and new CDP) is the most viable strategy for growing better PMs.

Full-grown Strategy. This strategy is not acceptable for the same reason the home-grown strategy is not: Adding a full complement of jobs and career development levels to the PM function is not an acceptable action given the scarcity of human resources in the Corps. It is also perceived as making PM another stovepipe, which the Corps leadership believes is undesirable. But, as a natural extension of farm-growing TMs and PMs, it has added value in growing better managers in the Corps. Its greatest benefit is that it provides early exposure to the function and the process of project management for the prospective TMs and PMs. Also, the PM process benefits from the work of these "trainees" as they rotate through the added positions.

PM as a Stovepipe. While the concern about PM becoming a stovepipe is understandable, there are safeguards against this happening. In stovepipes, the focus is on the function and its products and services, and its resources are managed to maintain the function and maximize its success. Project management is a process which serves to integrate stovepipe products and services to form projects. Project management is inherently horizontal, and, as a management process, has immunities to most of the ills of the stovepipe.

The pipe-lining method of PM career development and training will reinforce the horizontal integration focus of project management, and strengthen its immunities to the ills of the stovepipe in PM and in the other project development and operations functions that are helping to farm-grow TMs and PMs. The pipe-lining method is more than a way of developing and training PMs. It is a new philosophy for managing human resources which negates the current stovepipe system of management.

STRATEGY DECISION

In December 1993, the HQUSACE proponents of PM endorsed the farm-grown strategy, and asked IWR and the TAP to proceed with the development of a plan for career development and training for TMs and PMs. It was also decided that provisions would be made for training Interns in PPMDs, providing positions for them to rotate through during their internships. Action will also be taken to encourage the equitable treatment of PMs in their consideration for career advancement opportunities in technical functions.

Career Plans and Paths

The primary goals of a career development and training plan are 1) to satisfy the needs of the Corps for competent project and technical managers, and 2)

meet the needs of individuals for rewarding and successful careers in process management.

The farm-grown strategy for PM career development and training introduces an alternative plan and path for careerists in the technical functions to follow. Careerists who aspire to be process managers (TMs and PMs) will use the PM CDP, while those who plan to be either technical specialists or line (function) managers will use one of the existing functional CDPs. These basic alternatives are illustrated in Table 62.

62. ESRC CAREER PLANS & PATHS

	FM^P
	↑
PM^P	FM^F
↑	↑
TM^P	FM^F
↑	↑
TS^P	TS^P
↑	↑
TI^P	TI^F

P/ Use the career development and training plan for technical and project managers.
F/ Use one of the career development and training plans for technical staff and line managers

FM=Functional Manager PM=Project Manager
TM=Technical Manager TS=Technical Staff
TI=Technical Intern

The paths shown in Table 62 are the primary and preferred paths for the two alternative career development and training plans. Careerists will be permitted to change plans and paths if they change their aspirations. And, with the pipe-lining method in place, careerists following the new CDP will have a broader and firmer technical knowledge base which will facilitate transfer to staff and management jobs in the technical functions. (The paths in Table 62 apply to all project development functions, except as limited by the lack of positions in the functions, especially the absence of TS and TM positions in PPMDs and the absence of PMs in the other functions.)

Development and Training

The basic objective of a PM plan is to guide careerists to the right training at the right time, using the right balance of the three kinds of learning opportunities.

RIGHT TIMING

The project management career path (Table 62) can be divided into phases for introduction, preparation, and enhancement, training (illustrated in Table 63).

63. THREE PHASES OF TRAINING

TRAINING PHASE	KEY POSITIONS
3. Enhancement of Key Project Mgmt Skills	Project Manager & Technical Mgr
↑	↑
2. Preparation for Performing Project Mgmt	Technical Mgr & Tech Specialist
↑	↑
1. Introduction to Projects and Project Mgmt	Tech Specialist & Technical Intern

Interns and specialists need to be *introduced* to Corps project development and its management to confirm their interest and obtain fundamentals. Technical specialists and managers need to be *prepared* with knowledge and skills to enable them to perform the functions and roles of project management (prior to assignment to the job). And,

technical and project managers need to have the key skills of their jobs *enhanced* to enable them to excel and advance in their careers.

RIGHT BALANCE

The two basic mechanisms for acquiring career development and training (Chapter 1, Table 6) contain the three different kinds of learning opportunities available to careerists, which are used in the PM plan. The three opportunities and their relationship to the mechanisms are illustrated in Table 64.

64. THREE KINDS OF OPPORTUNITY

MECHANISMS	OPPORTUNITIES
Self-development Activity - Studies - Courses - Groups	Self-development Activity - Courses - Reading - Other
Employer Supported Training - On-the-Job - Developmental - Rotational - Formal Courses	Work Assignment Training - On-Job - Developmental Formal Classroom Training - Govt Courses - Non-Government

The right balance of the three kinds of opportunities is very critical to acquiring all of the development and training needed at each phase of the career. The study of career development and training (see Chapter 2) shows that balance is lacking: For example, the value of work assignments is recognized, but specialization and stovepipes preclude many cross-functional assignments. Also, while career management guidance ascribes equal value to self-development activity, it gets little attention and use, depriving careerists of many opportunities to learn and improve their job performance and career advancement. These lost opportunities contribute to the greater emphasis and reliance on formal classroom training seen in the existing plans. This kind of imbalance is guarded against in the PM plan by using the pipe-lining method and by giving special attention to self-development.

RIGHT TRAINING

In addition to using the right balance of opportunities, right training involves attending to the right functions and roles and using the right types of training and activity at each phase of the career (Table 63).

Right Work Roles. The three work roles needing the most emphasis in process management career development and training are the technical, management, and leadership roles. The relative priorities of the three roles at each phase of training is shown in Table 65.

65. ROLE PRIORITIES BY PHASE

TRAINING PHASE	ROLE PRIORITIES
3. Enhancement of Key Project Mgmt Skills	1st-Leadership 2nd-Management 3rd-Technical
↑	↑
2. Preparation for Performing Project Mgmt	1st-Management 2nd-Leadership 3rd-Technical
↑	↑
1. Introduction to Projects and Project Mgmt	1st-Technical 2nd-Management 3rd-Leadership

It is important that technical interns and specialists during their introduction to projects

and project management learn about project technologies and the general techniques used in the development and operation of those projects, and begin to learn about the concepts and methods of project management. In their later preparation for performing project management, the technical specialists and managers need to concentrate on learning the functions, tools, and techniques for managing the process of project development, and begin to learn and acquire the skills of team leadership. Then as practicing project and technical managers they need to master those leadership skills, and continue to improve their ability to perform the several functions included in process management.

Right Kind of Opportunity. The right balance of opportunities needs to be combined with the right emphasis at each of the three phases of training. The right emphasis is a function of who and what is being taught at each phase. For example, the most effective way of learning the technical aspects of Corps project development during the introduction phase is to have the interns and specialists exposed to them in meaningful work assignments. At the same time, they can begin to learn the concepts and methods of process management in formal classroom training, and they can take it upon themselves to get an introduction to team building and leadership with a program of self-development at a local university or library.

In general, work assignments are the most effective and the most preferred training at any phase of career. They need to be used to fullest advantage. However, in this case, where process management is new to the Corps, work assignments need to be supplemented with adequate employer supported and self-development programs of training courses to take full advantage of the state-of-the-art in the field at large. This is particularly critical during the preparation phase when specialists and technical managers need to be learning the best available management and leadership techniques and tools. The recommended use of opportunities is summarized in Table 66.

66. BASIC USE OF OPPORTUNITIES

P[1]	LEARNING PRIORITIES	LEARNING OPPORTUNITIES
3	1-Leadership	Work Assignments
3	2-Management	Formal Classroom
3	3-Technical	Self-Development
2	1-Management	Work Assignments
2	2-Leadership	Formal Classroom
2	3-Technical	Formal Classroom
1	1-Technical	Work Assignments
1	2-Management	Formal Classroom
1	3-Leadership	Self-Development

1/ Phase of career development & training.

Right Type of Training. The two kinds of employer supported training are work assignments and formal classroom training. Each of these includes various types of training. The basic break downs were noted above (see Table 64). The types of work assignment training used in the PM plan are the common ones: on-the-job experience, developmental assignments, and rotational assignments. These three types are differentiated primarily by the purpose and

permanency of the assignments: The purpose of OJT is to learn a permanently assigned job by doing it, alongside of others and under the tutelage of an experienced mentor. For each of the remaining types, the general purpose is the same: to learn about a job and gain selected knowledge and skills by temporarily performing its duties. Both of these types are "developmental". But, the one by that name occurs later in the career and lasts about six to twelve months, while rotational assignments occur during internships as shorter samplings of the jobs in the general career program.

Types of Training Courses. For the PM plan, a typology of courses was developed to help achieve the right training at the right time. The typology has two dimensions: the scope and the realm of the subject of the course. At the broad end of the scope dimension are the survey courses, teaching a wide range of subjects and covering each to only a shallow depth. At the other end of scope are the focus courses, covering one or a few related topics in some depth. In the middle are the process courses, which cover to a medium depth procedures and techniques of the development and the management of projects.

The realm dimension relates to the specificity of the course vis-a-vis the major missions of the Corps. The realm will be either civil works, military, HTRW/environmental, or generic --covering subjects that apply to any and all of the missions. The general recommendation for using these types of courses for the different phases of career training is summarized in Table 67. Note that in the introduction phase the courses are called overviews as they are both short and shallow.

67. USING THE TYPES OF COURSES

TRAINING PHASE	TRAINING COURSES
3. Enhancement of Key Project Mgmt Skills	1-Advanced Focus 1-Advancd Survey 1-Genric Process
↑	↑
2. Preparation for Performing Project Mgmt	3-Focus: Gen/Mis 2-Mission Proces 1-Generic Survey
↑	↑
1. Introduction to Projects and Project Mgmt	2-Mssn Overviews (short/shallow) 1-Gnrc Overviews

Note: No particular sequence is suggested for types recommended for the enhancement phase of training.

During the introduction phase, the major purpose of employer supported training courses is to introduce the interns and specialists to basic process management concepts (generic overviews) and the technical processes to which they are applied (mission overviews).

During the preparation phase, the major purpose of employer supported courses is to provide a foundation of knowledge and skills in the techniques and tools of process management and team leadership (generic survey and focus) and in the project development procedures of the Corps missions and technical functions (mission process).

During the enhancement phase, employer supported training is used primarily to help keep technical and project managers in tune with the art of process management and on top of its

practice within the Corps (all types apply to each goal).

Preview of Basic Plan

These considerations of right timing, right balance, and right training, are brought together in the basic PM career development and training plan summarized in Table 68. In each of the three phases of training, career development and training is suggested for each of the three kinds of learning opportunities. The details of the basic PM plan appear in the three parts of Table 69, one part for each training phase.

This basic PM plan is being used to prepare a new career development plan and a new master training plan for the programs and project management function. A handbook is also being written to aid employees with planning and management of their PM careers and training. It will contain the new PPM plans (CDP and MTP) and include a training guide based on the concepts presented above. It will also include instructions for using the directory of project management courses which will be published and distributed with the handbook in January 1996.

68. SUMMARY OF THE BASIC PROJECT MANAGEMENT CAREER DEVELOPMENT AND TRAINING PLAN

		WORK ASSIGNMENT TRAINING *(On-Job & Developmental)*	FORMAL CLASSROOM TRAINING *(Govt & Non-Govt Courses)*	SELF-DEVELOPMENT ACTIVITY *(Courses, Reading, Other)*
PHASE 3:	**ENHANCEMENT OF KEY PROJECT MANAGEMENT SKILLS** *Key Positions:* *Project Manager & Technical Manager*	*Emphasis:* **On-The-Job Experience** *more than* **Developmental Assignments**	*Sequence:* **Advanced Focus** *or* **Advanced Survey** *or* **Generic Process**	**Educational Courses & Readings** **Professional Participation** *with* **Professional Certification**
PHASE 2:	**PREPARATION FOR PERFORMING PROJECT MANAGEMENT** *Key Positions:* *Technical Manager & Technical Specialist*	*Emphasis:* **Developmental Assignments** *as much as* **On-The-Job Experience**	*Sequence:* **Generic & Mission Focus** *after* **Mission Process** *after* **Generic Survey**	**Educational Courses & Readings** **Professional Participation** *toward* **Professional Certification**
PHASE 1:	**INTRODUCTION TO PROJECTS AND PROJECT MANAGEMENT** *Key Positions:* *Technical Specialist & Technical Intern*	*Emphasis:* **Rotational Assignments** *more than* **On-The-Job Experience**	*Sequence:* **Mission Overview** *after* **Generic Overview**	**Educational Courses & Readings** **Professional Membership** *and* **Professional Participation**

69-1. BASIC PROJECT MANAGEMENT PLAN: INTRODUCTION TO PROJECTS AND PROJECT MANAGEMENT

WORK ASSIGNMENT TRAINING
(On-Job & Developmental)

Rotational Assignments in the following 9 functions[1]
3 months in each of below:
- ☐ Project management
- ☐ Planning
- ☐ Engineering
- ☐ Construction
- ☐ Operations

1 month in each of below:
- ☐ Programs
- ☐ Real estate
- ☐ Contracting
- ☐ Facilities engr

Special Assignments

Instruction on the Job

Discussions w/ Supervisor

Discussions w/ Employees

1/ Assigned to Project Manager or Technical Manager where possible

2/ Design/Build Functions:
- Planning
- Engineering
- Construction
- Operations

FORMAL CLASSROOM TRAINING
(Govt & Non-Govt Courses)

GENERIC OVERVIEW COURSES
Overviews of Universal PM Concepts, Methods, Process
- ● Project Mgmt (762:1)
- ○ Project Mgmt (762:2-4)
- ● Project Mgmt (355)

MISSION OVERVIEW COURSES
Overviews of Corps Mission Related Business Processes
- ● Civil Works (086)
- ○ Military Programs
- ● Environmental/HTRW (350)

SELECTED TECHNICAL COURSES
Courses Pertaining to the Intern's Specialty Area(s)
- ☐ University Discipline
- ☐ Design/Build Function[2]

SELF-DEVELOPMENT ACTIVITY
(Courses, Reading, Other)

Academic Extension Courses

Individual Reading & Study

Oral/Written Communication

Engineer-in-Training (EIT) Certificate *(if appropriate)*

Membership in Professional Associations

Membership in the Project Management Institute (PMI)

- ● Actual existing course
- ○ Course to be developed
- ☐ A category of training

See Directory for details.

69-2. BASIC PROJECT MANAGEMENT PLAN: PREPARATION FOR PERFORMING PROJECT MANAGEMENT

WORK ASSIGNMENT TRAINING
(On-Job & Developmental)

Developmental Assignments in Project Management and Technical Management jobs (six to 12 months each)

Continued Journeyman Work Assignments

1/ Management Functions:
- Planning
- Organizing
- Monitoring
- Controlling

and
- Scope Management
- Cost Management
- Time Management
- Human Resources Mgmt
- Quality Management
- Risk Management
- Contract Management
- Communications Mgmt

2/ Design/Build Function:
- Planning
- Engineering
- Construction
- Operations

3/ Project Management Professional

FORMAL CLASSROOM TRAINING
(Govt & Non-Govt Courses)

GENERIC SURVEY COURSES
Surveys of Universal PM Concepts, Methods, Tools
- ● Project Ldrship (PSG-03)
- ● The Complete PM (PSG-01)

MISSION PROCESS COURSES
Courses on Corps Mission Project and Mgmt Processes
- ● CW Prog Dev & Exe (010)
- ● Civil Works (353)
- ● Military Programs (088)
- ● Environmental/HTRW (260)

GENERIC FOCUS COURSES
Courses Focused on Set of Universal PM Techs & Tools
- ☐ Leadership Qualities
- ☐ Management Functions[1]
- ● Network Analysis (080)
- ● Earned Val Mgmt (PFM-19)
- ☐ Communication Skills
- ☐ Computer Application

MISSION FOCUS COURSES
Courses Focused on Mission PM Concepts and Techniques
- ● PCA/Fin Plan Devel (315)

SELECTED TECHNICAL COURSES
Courses Pertaining to the Worker's Specialty Area(s)
- ☐ University Discipline
- ☐ Design/Build Function[2]

SELF-DEVELOPMENT ACTIVITY
(Courses, Reading, Other)

Academic Extension Courses

Individual Reading & Study

Oral/Written Communication

Participation in Professional Associations

Participation in Project Management Institute (PMI)

Preparation for PMI PMP[3] Certification

Professional Registration or Certification

- ● Actual existing course
- ○ Course to be developed
- ☐ A category of training

See Directory for details.

69-3. BASIC PROJECT MANAGEMENT PLAN: ENHANCEMENT OF KEY PROJECT MANAGEMENT SKILLS

WORK ASSIGNMENT TRAINING
(On-Job & Developmental)

Developmental Assignments in Project Management and Technical Management Jobs (same and other echelons)

IPA/Interagency Personnel Agreement Assignment with Other Governmental Agency (or qualifying customer)

1/ Management Functions:
- Planning
- Organizing
- Monitoring
- Controlling

and
- Scope Management
- Cost Management
- Time Management
- Human Resources Mgmt
- Quality Management
- Risk Management
- Contract Management
- Communications Mgmt

2/ Design/Build Function:
- Planning
- Engineering
- Construction
- Operations

3/ Project Management Professional

FORMAL CLASSROOM TRAINING
(Govt & Non-Govt Courses)

ADVANCED SURVEY COURSES
Surveys of Universal PM Concepts, Methods, Tools
- ● PPM Associates Program
- ● PM Beyond Techs (ESG-01)
- ☐ LTT in Degree Programs

GENERIC PROCESS COURSES
Advanced Workshop Courses on PM Concept and Process
- ● PM Applications (EPG-01)

ADVANCED FOCUS: GENERIC
Advanced Courses Focused on PM Techniques and Tools
- ☐ Leadership Qualities
- ☐ Management Functions[1]
- ☐ Communication Skills
- ☐ Computer Application

ADVANCED FOCUS: MISSION
Advanced Courses on Corps Mission PM Concepts/Tools
- ○ CW Prog Execution (TBD)

SELECTED TECHNICAL COURSES
Courses Pertaining to the Worker's Specialty Area(s)
- ☐ University Discipline
- ☐ Design/Build Function[2]

SELF-DEVELOPMENT ACTIVITY
(Courses, Reading, Other)

Academic Extension Courses

Individual Reading & Study

Oral/Written Communication

Participation in Professional Associations

Professional Registration

Participation in Project Management Institute (PMI)

PMI PMP[3] Certification

● Actual existing course

○ Course to be developed

☐ A category of training

See Directory for details.

ENDNOTES

1. Memorandum for MACOM Commanders, USACE Divisions and Districts, Separate FOA and HQUSACE Directorates, Subject: CP-18 ACTEDS Plan, signed by Richard C. Armstrong, P.E., dated June 22, 1993.

2. Army Regulation 690-950, Civilian Personnel: Career Management. Headquarters, Department of the Army, Washington, DC. September 8, 1988. And, ACTEDS, Army Civilian Training, Education, and Development System: Engineers and Scientists (Resources and Construction) Plan, transmitted to the field on December 3, 1990, by the Functional Chief, LTG Hatch.

3. These statements were not crafted for use in a survey; they serve to provoke thought and discussion, but are vague and ambiguous as measures of opinion.