

- I. Program Planning
 - 1. Introduction to program planning
 - Hierarchical structure of program/project/activity planning (concepts, examples)
 - Definitions
 - Examples of projects
 - JFK2000
 - A flood control program (the Passaic program, the diversion tunnel project)
 - A landfill closure program (the PAL and FAL landfill closure program)
 - Constraints that affect the planning process
 - Physical constraints
 - Technological constraints
 - Economic constraints
 - Social constraints
 - Ecological constraints
 - Political constraints
 - 2. The planning process
 - The planning process
 - Problem formulation
 - Identify problems and needs
 - Collect and analyze data
 - Develop goals and objectives
 - Identify hard and soft constraints
 - Conduct analysis
 - Identify alternatives
 - Analyze alternatives and assess impacts
 - Evaluate and recommend selected alternative
 - Implementation
 - Develop implementation plan
 - Evaluate and manage
 - Example: Gowanus Expressway
 - 3. Economic analysis of alternatives
 - 4. Introduction to probability and statistics
 - 5. Decision making

INTRODUCTION

The nature of the construction industry:

- Roughly 8.3% (\$418 billion) of US' GNP (1988)
- Largest industry
- One of ~~country's~~ largest employers
(6% of private employment, 5% of the total jobs)
- Thousands of small businesses
- Highly heterogeneous & enormously complex
- Highly fragmented
- Very custom-oriented

Types of construction projects:

- Residential (30-35% of annual construction ~~costs~~ expenditure)
- Building construction (35-40%)
- Heavy Engineering construction (20-25%)
- Industrial Construction (5-10%)

Construction Management:

Addresses how the resources available to the manager can best be applied. (~~4 "M"s~~ of ~~construction resources~~)

4 "M"s of construction resource:

- Manpower
- Machines
- Materials
- Money

Management involves the timely & efficient application of the 4 "M"s to construct a project.

- Construction management is resource-driven

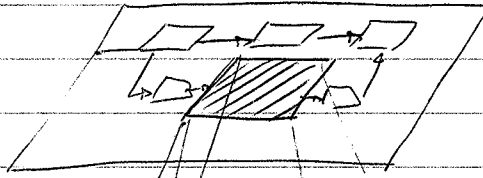
PART I: PROGRAM PLANNING.

The hierarchical ~~process~~ ^{structure} of the civil engineering planning process

Examples

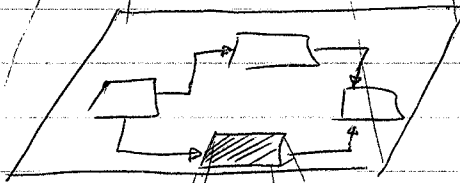
Hierarchical
Planning Process

Airports, highway systems, communities, military bases, water distribution & treatment systems



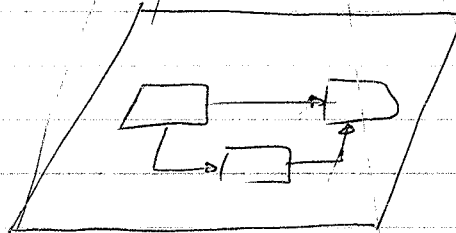
Program Planning

Buildings, roads, waste treatment facilities, runways, hangars, etc.



Project Planning

Foundations, roofs, road subgrade, structural assembly, etc.



Activity planning

Chapter 1: Introduction to Program Planning

1.1 Introduction

Traditional Civil Engineering

Structural
Geotechnical
Construction
etc.

technology
→
+
competition

Additional skills required

Planning
Feasibility analysis
financing
design
O&M

Civil Engineers need also have other tools & skills:

ethics	management
communications	planning
leadership	ability to plan & execute projects.

Planning: the process of developing & formulating a course of action to be taken in the future. Systematic identification of program tasks, task schedules and the resources required for task accomplishment.

- Program planning
- Project planning
- Activity planning

Example: JFK 2000 ~~project~~ program

- Central Terminal project
- Aircraft control tower project
- Roadways project
- A people-mover project
- A baggage handling project
- Utilities upgrade project

Each project was ~~for~~ broken into subprojects, and activities

1.2 Definitions

Planning: Systematic identification of program & project tasks, task schedules, and the resources required for task accomplishment

Program planning: A process to develop & select the best ~~model~~ course of action for fulfilling goals & objectives defined by identified problems or needs

Project planning: A process to develop and select the best model for accomplishing a specific project's objectives

Activity planning: A process to develop & select the best methods for accomplishing the objectives of a particular activity. The result of activity planning should be resources (or crew sizes), costs, and activity durations

Project scheduling: A process to develop scheduling data and a final schedule based on the selected network model, and the operational plan for accomplishing each activity.

Project control systems: the reports and procedures used in the control of time, resources, dollars, and quality of a project.

Constraints: Those factors that limit the ability of the planner to select an optimal alternative with respect to their primary decision variable, usually economic.

Constraints may be physical, technological, economic, social, ecological or political.

Stakeholders: Those individuals & organizations who have a strong interest in the planning decisions.

General public: Many public planning processes involve a "public interest review" to determine if the project is in the "public interest". The general public is the population affected by the outcome of any public decision.

1.3 Applications

JFK 2000

Background:

JFK constructed in 1950's

Currently: Aiside → 4 runways, 45 million passengers/year
Landside 15 million

1988: 32 million passengers (service unacceptable)

20 development alternatives examined

2 possible ^{new transportation} alternatives (because of landside is a circle)

radial

circumferential

selected

Selected alternative:

Central terminal complex (baggage handling system, passenger distribution system)

New roadway system

Rehabilitated utility systems

Passenger distribution systems

Cranes

Underground baggage distribution system

New air traffic control tower

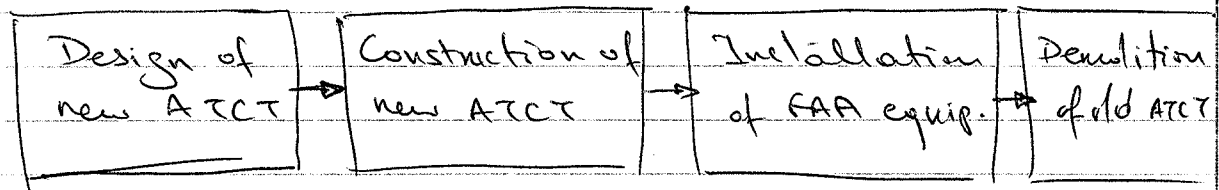
Cost: \$3.2b (1989)

A JFK 2000 project:

Air Traffic Control Tower (ATCT)

On the critical path for Central Terminal Complex

(must have been in place before the old tower next to new complex was to be demolished)



Project was completed 2 years behind schedule

An Activity:

ATCT was a concrete structure

→ Core structure was on the critical path

Concrete placement was critical

→ ATCT was on the airside → escort was needed for each concrete delivery

→ not anticipated → delays

Epiloge:

IFX 2000 failed

1991 deregulation of airline industry
airlines refused to let their passengers to go
to central terminal

After years of designs, the central terminal
complex was ~~abandoned~~ aborted

Currently, rebuilding International Arrivals
Building and use a circumferential
transportation concept.

B6. Διαχειριστικά Θέματα στη Διαδικασία Κατασκευής

B6. Managing the Building Process

Μάθημα Κατεύθυνσης Β – Εαρινό Εξάμηνο 2004

LECTURE 1

CONSTRUCTION INDUSTRY STRUCTURE

- Project Participants
 - Owner
 - Architect / Engineer (A/E)
 - Contractor (GC)
 - Subcontractors (Subs)
 - Construction Manager (CM)
 - Program Manager (PM)
 - Stakeholders
 - General Public

- Project Delivery Methods
 - Traditional (Design – Bid – Build)
 - Turnkey (Design – Build)
 - Design – Bid – Build – OperateAdvantages/Disadvantages

*Build - Operate - Transfer (BOT)
Privately Funded Investment (PFI)*

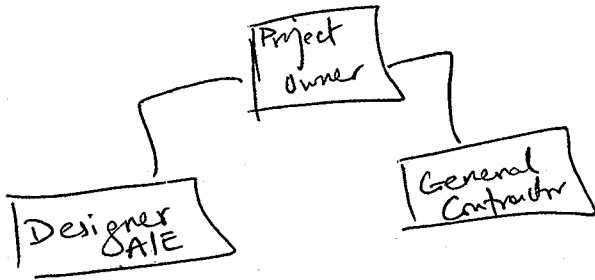
- Contracting Methods
 - Lump Sum (Fixed Price)
 - Unit Price
 - Construction Management (CM)
 - CM/GC
 - Cost Plus
 - Fixed Fee
 - Incentive Fee

Advantages/Disadvantages

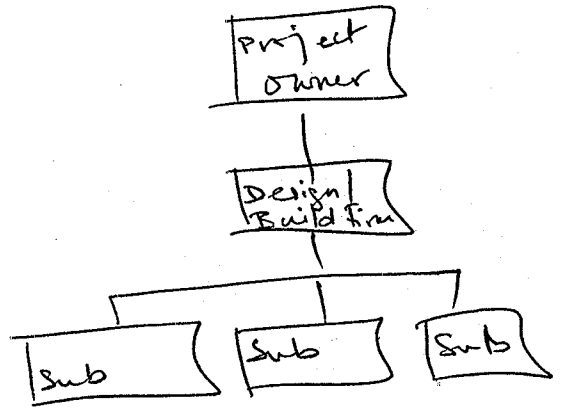
- Contractual Arrangements/Structures
- Partnering/Alternative Dispute Resolution (ADR)

Contracting Arrangements

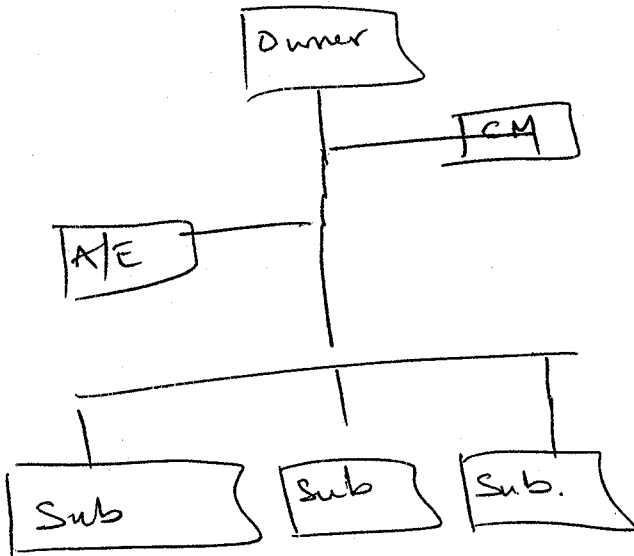
A. Design/Bid/Build



B. Design/Build



C. Construction Management



D. Owner/Agent

