The Pentagon Reconstruction Project

- Hijacked American Airline 77 slammed into the west face of the Pentagon on September 11, 2001
- Phoenix project was formed on the same day without any preplanning, budgets, or contract approval
- The primary constraint – one year deadline to complete the reconstruction
- Pentagon Renovation Program, PenRen resource reallocation to form the Phoenix Integrated Project Team (IPT)
- Overnight the budget was estimated, based on historic cost data from the ongoing PenRen Project
- U.S. Congree authorized $700 million in emergency funds
The Pentagon Reconstruction Project (cont.)

- Traditional Approach: Design-Bid-Build
  - Start-up delay, conflict between contractors and owners

- The Design-Build Approach:
  - Allowed design and construction to operate as a single entity under one contract

- Tight schedule
  - Concurrent scope and plan development in parallel to project execution
  - Ultra-fast track schedule was developed
  - The construction was divided into three horizontal stages

The Pentagon Reconstruction Project (cont.)

- New Procurement plan
  - The Government Program Office was exempt from system integration responsibilities
  - Contractors were fully responsible for
    - The system integration, Subsystems, Equipment, Support Equipment, Validate full system performance after integration

- Advantages
  - Decrease implementation time
  - Increase product quality
  - Reduced engineering changes, program office staff, and over all project cost

The Pentagon Reconstruction Project (cont.)

- What is the bottom line?
  - 3,000-member project team, 28 days ahead of schedule and $194 million under budget
  - Success factors: people and procedure

- Additional References
The Need for Effective Management Process

Many Enterprise Mission
- Accelerating development projects
- Effectively utilizing resources
- Minimizing implementation risk

Modern business/technology leaders must deal effectively with
- Time-to-market pressure
- Innovation
- Cost
- Risks

Modern business/technology leaders must deal effectively with
- Time-to-market pressure
- Innovation
- Cost
- Risks

The Need for Effective Management Process – From Idea to Market

Reducing project cycle time => cost saving, risk reduction, market advantages, and strategic benefits

Project Management
- Tools and techniques has been around since the Industrial Revolution of the 18th century focused on mass production, agriculture, construction, and military operation
- Officially recognized as a business discipline and profession – 1950s
- Balance Efficiency, Speed, and Quality

The Need for Effective Management Process – From Idea to Market

New Project Management Tools and Delivery Systems
- Under - Integrated product development (IDP) applications
- Found in wide spectrum of modern projects:
  Construction, Research, Foreign Assistance Program, Election Campaigns, IT systems installation
- Focus on
  - The effective, integrated, and often concurrent multidisciplinary project team efforts toward specific deliverables
  - The concurrent engineering processes
A Spectrum of Contemporary Management Systems

- Project Environment
  - Manufacturing
  - Marketing
  - Software Development
  - Field Services
- Mission Specific Project Management Platforms
  - Design for Manufacture (DMF)
  - Just-in-Time (JIT)
  - Continuous Process Improvement (CPI)
  - Integrated Product and Process Development (IPPD)
  - Structured Systems Design (SSD)

Mission Specific Project Management Platforms (cont.)

- Rolling Wave Concept (RW), [http://www.project-management-knowledge.com/definitions/r/rolling-wave-planning/](http://www.project-management-knowledge.com/definitions/r/rolling-wave-planning/)
- Phased-Development (PD)
- Stage-Gate Processes
- Integrated Phase-Review (IPR)

Concurrent Engineering – A Unique Project Management Concept

- An extension of multiphased approach to project management
- Overlapped task segments increase the need for strong cross-functional integration and team involvement
- Figure 4.1 Graphical Representation of Concurrent Execution of Project Phases (R&D, Engr, Mfg, Fin, ..., Mktg)
  - Phase 1 – Concept
  - Phase 2 – Development
  - Phase 3 – Production
  - Phase 4 – Rollout
  - Phase 5 – Field Support
Concurrent Engineering – A Unique Project Management Concept

Table 4.1 Potential Benefits of Concurrent Engineering

- Better cross-functional communication and integration
- Decrease time to market
- Early detection of design problems, fewer design errors
- Emphasizes human side of multidisciplinary teamwork
- Encourage power sharing, cooperation, trust, respect, and consensus building
- Engages all stakeholders in information sharing and decision making

Concurrent Engineering – A Unique Project Management Concept (cont.)

Table 4.1 Potential Benefits of Concurrent Engineering (cont.)

- Enhances ability to support multisite manufacturing
- Enhances ability to cope with changing requirements, technology, and markets
- Enhances ability to execute complex projects and long-range undertakings
- Enhances supplier communication
- Fewer engineering changes
- High-level of organizational transparency, R&D-to-marketing

Concurrent Engineering – A Unique Project Management Concept (cont.) (cont.)

Table 4.1 Potential Benefits of Concurrent Engineering (cont.) (cont.)

- Higher resource efficiency and personnel productivity; more resource-effective project implementation
- Minimizes “downstream” uncertainty, risks and complications; makes the project outcome more predictable
- Minimize design-build-rollout reworks
- Ongoing recognition and visibility of team accomplishments
- Promote total project life cycle thinking
### Concurrent Engineering – A Unique Project Management Concept (cont.)

- **Table 4.1 Potential Benefits of Concurrent Engineering**
  - Provides a template or roadmap for guiding multiphased projects from concept to final delivery
  - Provides systematic approach to multiphased project execution
  - Shorter project life cycle and execution time
  - Validation of work in progress and deliverables

- Society for Concurrent Project Development, [www.scpdnet.org](http://www.scpdnet.org)

### Criteria For Success

- **Tables 4.2 Criteria for Successful Management of Concurrent Engineering Projects**
  - Up-front planning – allocate sufficient time and resources
  - Identify major task teams, mission, interface at the beginning of project cycle
  - Logics and protocol for concurrent phase implementation
  - Master project plan (top level) covering the whole project life cycle
  - Etc. (see page 67)


### Defining the Process to the Team

- **Tables 4.2 Criteria for Successful Management of Concurrent Engineering Projects**
  - Up-front planning – allocate sufficient time and resources
  - Identify major task teams, mission, interface at the beginning of project cycle
  - Logics and protocol for concurrent phase implementation
  - Master project plan (top level) covering the whole project life cycle
  - Etc. (see page 67)

Defining the Process to the Team

- Each Project Phases or Stages
  - Scope, Objectives, Activities, Deliverables
  - Functional Responsibilities
- Quality Function Deployment (QFD) Matrix
  - The specific cross-functional requirements
  - The methods of work transfer (technology transfer)
  - The stakeholder interactions (capturing and dealing with changes that ripple through the product design process)

Figure 4.2 Quality Function Deployment (QFD) Matrix for defining interfaces
- 5 x 5 matrix
- 25 interfaces
  - Arrows – Input/output requirements
  - Personnel Contacts
  - Types and timing of deliverables
- Upstream phases (design process)
- Downstream

Understanding The Challenges

- Strong autonomy of task teams makes system integration a shared responsibility of all team leaders
- Power an resource sharing => sophisticated management style, conflicts and politics
- The focus on process templates (i.e. CE) tends to make project execution rigid
- CE process templates tend to isolate task teams within their program activities
- Objectives focused on phase outputs, such as deliverables, rather than on overall project and mission objectives
Understanding The Challenges (cont.)

- The need for self-directed teamwork limits top-down and central control
- The need to work with incremental, partial inputs and outputs at the task level, makes project planning, measurements, and progress reporting more difficult
- Intricate work processes such as concurrent engineering require additional administrative support, management, and resources
- Implementing and sustaining concurrent engineering requires senior management involvement and support, and long-term organizational commitment

Understanding the Organizational Components

- Additional Insight
  - Uniform Process Model
    - Primary Benefit
    - Secondary Benefits
  - Integrated Product Development (IPD)
  - Gate Functions
  - Standard Project Management Process
  - QFD Approach
  - Early Testing
  - Total Organizational Involvement and Transparency
Recommendations for Effective Management

- **Phase I: Organizational System Design**
  - Take a System Approach
  - Build on Existing Management Systems
  - Custom Design

Recommendations for Effective Management

- **Phase II: System Implementation**
  - Define Implementation Plan
  - Pretest the New Technique
  - Ensure Good Management Direction and Leadership
  - Involve People Affected by the New System
  - Anticipate Anxieties and Conflicts
  - Detect Problem Early and Resolve
  - Encourage Project Teams to Fine-Tune the Process
  - Invest Time and Resources

Recommendations for Effective Management

- **Phase III: Managing in Concurrent Engineering**
  - Plan the Project Effectively
  - Define Work Process and Team Structure
  - Develop Organizational Interface
  - Staff and Organize the Project Team
  - Communicate Organizational Goals and Objectives
  - Define Work Interface and Effective Communication Channels
  - Ensure Senior Management Support and Leadership
  - Manage Conflicts and Problems
  - Encourage Continuous Fine-Tuning and Improvement
Questions & Summary

- Critical Thinking: Questions for Discussion