Work Structuring

LCI White Paper #5
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June 12, 1999
Las Vegas, NV

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Work Structuring = Process Design

• In what chunks will work be assigned to specialists?
• How will work chunks be sequenced?
• How will work be released from one production unit (PU) to the next?
• Where will decoupling buffers be needed and how should they be sized?
• When will the different chunks of work be done?
Objectives of Work Structuring

• Mega Objectives:
  – Deliver value to the customer.
  – Make work flow reliable and quick.

• Work Flow Objectives:
  – Design for continuous flow processes where possible.
  – Increase the overlap between cyclical operations.
  – Shift fabrication and subassemblies to shops.
3 Kinds of Flows
Assembly Hierarchy

- Product (a 6 story office building)
- Phase (superstructure)
- Module (floors 1-3)
- Process (Erect steel frame)
- Operation (Align steel frame)
- Assignment (Torque bolts)
Design Flow

- Determine requirements
- Translate requirements into design criteria
- Select concepts, systems, & technologies
- Design the design, supply, & assembly processes
- Select components and materials
- Integrate components into systems and systems into the facility through detailed engineering
Supply Flow

- Detail the design
- Acquire materials
- Fabricate components
- Make subassemblies
- Transport to assembler
Work Structuring Framework

• Define processes as sets of connected operations through which work flows iteratively or with little or no queue time.
• Use decoupling buffers and explicit release mechanisms to control work flow at the handoffs between processes.
• Assign PUs with the needed skills & capacities to operations.
• Note: Typically, PU teams will be assigned collective responsibility for the processes in which they participate.
BASIC WORK FLOW PATTERN: ITERATIVE LOOP
BASIC WORK FLOW PATTERN: CONTINUOUS FLOW PROCESS (CFP)
Organizing for Work Structuring

• Work structuring is a design process. Like all design processes, some work flows through iterative loops. Assign the task of work structuring to the entire production team, including design, supply, and assembly.

• Basic roles: Client, Planner, Design Specialist, Supplier, and Specialty Contractor.
Project Delivery Process

- Requirements
- Concepts/Technologies
- Design Criteria
- Work Structure
- Components
- Detailed Engineering
- Purchasing, Fabrication, & Delivery
- Installation & Testing & Turnover
- Post Occupancy Learning & Feedback

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Project Delivery Process
Chunking

• Guidelines
  – Group work together that is to be done by the same resources either simultaneously or consecutively.
  – Assign iterative design tasks collectively to the team having the needed capabilities.
  – Avoid throw-it-over-the-wall.
  – Pursue the lean ideal of providing a custom product, in zero time, from nothing in stores.
Sequencing

• Do only work that releases other work,
• or
• Do work that does not make other work more difficult, costly, or longer.
Releasing

- Recipients pull needed materials and information from providers.
- Work is released to a process when it is placed in the workable backlog of that process.
- Providers assure conformance to requirements.
- Recipients select work from backlog.
Decoupling

• Where can variability be expected?
  – quantity, timing of deliveries, quality
• Inventory or capacity buffer?
  – Is time or cost more critical?
  – Will the underutilized resource be ‘compensated’?
  – Can an inventory buffer be created?
  – Can a capacity buffer be created?
Scheduling

• Apply available resources within available durations. Adjust as needed
• Hierarchy of schedules
  – master
  – lookahead
  – weekly
Selecting, sequencing, & sizing work we think can be done

Master Schedule

Lookahead

Selecting, sequencing, & sizing work we know can be done

Weekly Work Plans

Chart PPC & Reasons

Action to prevent repetitive errors

Current status & forecasts

Information

Make work ready by screening & pulling

Workable Backlog

Resources

Production

Completed Work

Weekly Work Plans

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Entry Rules

- Rule 1: Allow activities to remain in the master schedule unless positive knowledge exists that it should not or cannot be executed when scheduled.

- Rule 2: Allow activities to remain in the lookahead window only if the planner is confident that it can be made ready for execution when scheduled.

- Rule 3: Allow activities into weekly work plans only if all constraints have been removed.
Ice House Project
Process Flow Diagram
Fire Sprinkler

Water/Bldg Dept Input

Site Plan

Parking Structure As-Built

Bldg. Arch. Plans

Meet with City

Beam Penetrations Design

Basic Sprinkler System Requirements

Beam Locations

Civil Input; Location of Taps

Floor Plan

Floor-to-Floor Heights

Reflective Ceiling Plan

HPR Ins.

Target Cost

Initial Coordination (Layout Sprinklers)

Final Coordination (Pipe Routing)

Prepare Permit Drawings

Review by AIA of Record

Testing & Commissioning

Site Installation

Deliver Materials to Site

Fabrication

Pay Tap Fees

Fire Sprinkler Permit Granted

BOM

Permit Process

Permit Drawings

Detailing

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