Project Planning & Control

Lesson 7
Emerging Trends/Tools in Project Planning

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Emerging Trends/Tools in Project Planning

- Location Based Management Systems (LBMS)
- 4D – Scheduling with BIM
- Design Structure Matrix (DSM)
- Discrete Event Simulation
- Critical Chain Project Management (CCPM)
- Lean Construction
LOCATION BASED PLANNING

• Most Construction Planning approaches don’t explicitly model construction path.

• Work Location is an important resource

• Tools for Location Based Management System (LBMS) are available today

• Basic Concept is similar to the well known Linear Scheduling Method (LSM) – But application today is broader.
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<th>Date</th>
<th>Week 1</th>
<th>Week 2</th>
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**Day 1**

- Wall reinforcement
- Wall formwork
- Wall concreting
- Wall de-shuttering
- Deck formwork
- Deck reinforcement
- Deck concreting
- Deck de-shuttering

*Figure 03 – Plan showing Day 01 Target*
Location Based Planning

The diagram illustrates the progression of various tasks across different locations over a project timeline. Each task is represented by a line with distinct labels and markers indicating the start and completion times. The horizontal axis represents the project time in weeks, while the vertical axis represents different locations (A, B, C, D). The graph shows how tasks are scheduled and executed at different locations to optimize the project timeline.
Location Based Planning

Order of completion

Sequence of production

Space Buffer

Time Buffer

- Tower 1
  - Plasterboard walls
  - Finishing to walls & ceilings
  - Tiling
  - Priming & sealing
  - Installation of fittings
  - Floor coverings
  - Finish doors & windows
  - Painting

- Tower 2
  - Time Buffer

- Roof
  - 1
  - 2
  - 3
  - 4
Location Based Planning
Location Based Scheduling Vs. CPM

• Location provides the container for all project data and is used as the primary work division through a LBS. In addition to the more familiar Work Breakdown Structure (WBS). ¹

• CPM scheduling emphasizes ²
  – The project duration and the critical path to achieve the set duration.

• LBS emphasizes ²
  – Physical “locations” to plan, analyze and control workflow.
  – LBS focuses on production efficiency as resources move through locations.

¹ Kenley and Seppänen, 2009
² Lowe et al., 2007
4D – Scheduling – Using CAD/BIM
4D SCHEDULE

https://www.youtube.com/watch?v=pY8DQgFryPk
Design/Dependency Structure Matrix (DSM)

To Represent the information dependencies:
A two-dimensional matrix representation of the structural or functional interrelationships of objects, tasks or teams.

Advantages

- Represent and Captures information cycles
- Compactness
- Easy to Read
- Appropriate for Planning the Design Phase & Information interfaces
Partitioning

Rearranging the rows and columns

a) To remove the feed back marks from the matrix
b) To move the feed back marks as close as to the diagonal

Original matrix

Partitioned matrix
Clustering

Grouping the off diagonal elements by reordering the rows and columns (Browning 2001)

- Maximize the iterations between the elements within the cluster and minimize the iteration between the clusters.
- Allow some overlapping of clusters

 Teams formed after DSM analysis.

**Team 1** consists of 2 3 4 7;  **Team 2** consists of 1 5 6
Design Team formation – Network Representation

Before DSM analysis

After DSM Analysis

Refer to www.dsmweb.org for more information
Simulation

• Discrete Event Simulation in Construction
• Active research area since 1970’s
• Industry applications since 2000’s

Critical Chain Project Management


• Addresses Several practical issues in Project situations

• Focus on resources and creating/managing buffers.

• Software tools are available today for implementing concepts
Lean Project Delivery

- Adaptation of Toyota Production System concepts to construction

- A key concept is to identify and eliminate waste to improve productivity -> cost & time performance → system level approach