MovePlan: Allocating Space During Scheduling

by Pierrette P. Zouein, Graduate Student Research Assistant, and
Iris D. Tommelein, Assistant Professor

Department of Civil and Environmental Engineering, The University of Michigan, Ann Arbor.

Motivation:

Traditional computerized planning and layout tools are stand-alone systems.

Existing layout algorithms construct a single layout for the entire project duration.

Space interacting with time is a resource that must be planned for.

Computers augment human tasks by keeping track of positions, so layouts need not be static.

MovePlan Research:

Product:
Develop an interactive graphical support tool to help:
• Construct an activity schedule.
• Depict resource use over time.
• Construct different layouts for different time spans.

Assumptions:
• Resource on site for activity ES to EF
• Resource positions may differ in different time spans.

Features:
• User selects layout time span.
• MovePlan only permits time spans that extend over consistent layouts.
• MovePlan positions resources located in time-overlapping layouts and user positions other resources.
• User may change positioned resources if MovePlan can maintain consistency over affected layouts.

Goals:

Enable planners to consistently construct layouts changing over time.

Assess viability of integrated layout-scheduling.

Use MovePlan as a knowledge acquisition tool.

Use knowledge gained from field practitioners for developing future extensions.

Problem:

[Diagram showing site congestion, dependencies, schedule changes, and alternative construction methods with annotations and a legend forExcavation line, Foundation walls, Truck-mounted crane, Formwork lumber, Rebars #4 & #5, Rebars #3 & #6, Truck mounted concrete pump]
MovePlan: Allocating Space During Scheduling
by Pierre P. Zouein, Graduate Student Research Assistant, and
Iris D. Tommelein, Assistant Professor
Department of Civil and Environmental Engineering, The University of Michigan, Ann Arbor.

Implementation:
object-oriented language
Macintosh Common Lisp 2.0

Moveplan Menubar:
File Edit Project Activity Resource Layout MCL 2.0b1

MovePlan Input:
- Project
  - Project Name: Courter Bldg
  - Site Dimensions: (400 500)
  - Space Units: feet
  - Start Date: 0
  - Time Units: days

- New Activity
  - Description: Found. walls formwork
  - Duration: 5
  - Predecessors: activity-5, activity-21
  - Resources: resource-4, resource-3

- New Resource
  - Description: crane
  - Dimensions: 5 5

Moveplan Output:
- LAYOUT-4-6
- LAYOUT-0-4
- LAYOUT-6-10
- SCHEDULE
  - activity-1
  - activity-2
  - activity-3
  - activity-4
  - activity-5

Note: Professor Tommelein's new address:
University of California Berkeley, 215-A McLaughlin Hall, Berkeley, CA 94720-1712, tommelein@ce.berkeley.edu, PHONE: 510/643-8678, FAX: 510/643-8919