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8.0 Construction Management Breadth

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Short Interval Production Scheduling (S.I.P.S.):

As a final study for this thesis report, I chose to try my hand at a construction management technique known as Short Interval Production Scheduling or S.I.P.S. This type of scheduling involves detailed production planning and a great deal of individual construction trade organization, all in an effort to shorten overall building construction schedules.

S.I.P.S. is based on efficiency rather than speed and excels in repetitive construction and/or production projects. This is due to the fact that repetition minimizes the learning curve experienced by everyone involved with a construction project. As construction moves forward and everyone's job is consistently repeated over and over, production becomes quicker and quality levels are heightened (a.k.a. everyone involved becomes more efficient).

Other benefits of S.I.P.S. include the elimination of stacking trades, the ability to level resources, greater predictability, better communication, easier tracking, better field damage control, better housekeeping control, and more quality control integration.

For the Montgomery County Conference Center and Hotel project, the hotel portion of the building was a prime candidate for a Short Interval Production Scheduling study. With its almost identical 2nd through 10th floors, repeating organized construction processes throughout this portion of the building's hotel was simple.

The first step involved breaking the 2nd through 10th floors' activities down into specific construction activities that could be applied to every individual hotel floor. Then, each activity had to be quantified and assigned a production rate. Most of this information was gathered and put together with the help of the hotel's original construction schedule. The following table shows the initial list

of all activities that needed to happen per hotel floor along with the specific activities' expected durations.

One Floor - Example (2nd Floor) Original Schedule			
Structure - Concrete Frame:			
Columns (Pour 2A)	2	days	
Frame Deck (Pour 2A)	3	days	
Install Rebar (Pour 2A)	2	days	
Columns (Pour 2B)	2	days	
Place Concrete (Pour 2A)	1	days	
Frame Deck (Pour 2B)	3	days	
Concrete Cure and Strip Letter (Pour 2A)	3	days	
Install Rebar (Pour 2B)	2	days	
Strip and Reshore (Pour 2A)	3	days	
Place Concrete (Pour 2B)	1	days	
Concrete Cure and Strip Letter (Pour 2B)	3	days	
Strip and Reshore (Pour 2B)	3	days	
Remove Reshores after 21 days (2A)	1	days	
Remove Reshores after 21 days (2B)	1	days	
Core Systems - HVAC Distribution - HVAC/Plumbing Riser System RI and INSP			
Riser Rough-In begins	1	days	
10" CS + CR Piping up to CT	2.25	days	
HCH-1-14 Guestroom Risers	2.25	days	
HCH 15,16 to Rooftop AHU's	2.25	days	
CS/1 and CS/2 Corridor Supply Duct	2.25	days	
SE-1 Corr. Exhaust Duct	2.25	days	
SP-1 and SP-2 Stair Supply Ducts	2.25	days	
LE and VME Exhaust Ducts	2.25	days	
TE-1 - TE-14 Toilet Exhaust Ducts	2.25	days	
Linen Chute	2.25	days	
All Plumbing Risers / Stacks	2.25	days	
Riser Systems Inspected / Ready for Close-in	1	days	
Sprinkler Distribution			
Second Floor	5	days	
Electrical Distribution			
Second Floor - Busway, Riser, Panels - A	2.5	days	
Second Floor - Busway, Riser, Panels - B	2.5	days	

Interior Build-Out - Second Floor			
Layout Drywall Partitions	5	days	
Shaftwall at (Guestroom Duct Risers)	4	days	
Frame and 1-Side (Corr. and Bath Walls)	8	days	
Install Door Frames	4	days	
Perim. Firestopping and INSP	4	days	
MEP Wall R/I and Tubs (Bath and Corr. Walls)	10	days	
Wall Close-in Inspections	3	days	
Hang and Finish Bath / Corr. Walls	10	days	
Drywall Ceiling Framing	10	days	
MEP Ceiling R/I	8	days	
MEP Ceiling R/I and INSP	3	days	
Hang and Finish Drywall Ceilings	10	days	
Guestroom Dimising and Exterior Wall Framing	10	days	
Millwork and Trim	5	days	
Set and Pipe FCU's (Guestrooms)	5	days	
Prime Painting of Bathrooms	2	days	
Ceramic Tile (Bathrooms)	8	days	
MEP R/I and INSP (dimising and ext. walls)	8	days	
Vanity Tops	4	days	
Hang and Finish (Guestroom Walls)	10	days	
Mirrors	4	days	
Prep. Conc. Ceilings	7	days	
Prime Painting of Guestrooms	4	days	
Orange Peel Ceiling Finish	5	days	
Wallcoverings	10	days	
MEP Finishes and Caulking	8	days	
Bath and Room Accessories	10	days	
Carpet and Base	5	days	
Install Doors and Hardware	5	days	
Finish Paint	5	days	
Final INSP	5	days	
Final Clean	3	days	
Punch-Out	15	days	
Owner Furnishings	10	days	
Total:	291.5	days	
	58.3	weeks	
With Overlap of Trades/Floors 2-10:	51	weeks	

Table 18: MCCCH Specific Hotel Construction Activities per Floor

As one can see, it took 291.5 days or 58.3 weeks to complete one hotel floor with no overlapping of trades/individual floors' construction. With overlapping and combining different floors' construction processes, the overall original hotel

construction schedule spanned 51 weeks. Therefore, for my S.I.P.S., the goal was to realistically shorten this schedule to less than 51 weeks.

By logically combining related trades from the above table and creating detailed ‘mini-schedules’ for times of different trade overlap, a time-scaled, resource-loaded bar chart for MCCCH’s 2nd through 10th hotel floors’ construction was created. The resulting Short Interval Production Schedule for the 2nd through 10th hotel floor ended up spanning 45 weeks compared to the original schedule’s 51 weeks. This gave a time/cost savings of 6 whole weeks on top of the possibilities for easier construction and better finished quality overall.

The entire S.I.P.S. calculation/time-scaled, loaded bar chart construction schedule for MCCCH’s 2nd through 10th hotel floors can be viewed in Appendix J. All detailed ‘mini-schedules’ for possible trade overlaps can also be viewed in Appendix J.

Economic Analysis of MCCCH’s S.I.P.S.:

The first cost savings or construction savings that could be realized by removing 6 weeks from MCCCH’s construction schedule were calculated and are displayed below in Table 19. Only general condition construction costs were used to calculate the possible savings but, the savings were tremendous.

SIPS Results \$\$\$:	
Entire Building Construction Schedule Length (weeks):	62
General Conditon Costs for Entire Hotel Schedule Length:	\$2,000,000
Average General Condition Costs per Week:	\$32,258.06
Weeks Saved in Schedule by using SIPS (weeks):	6
Savings Calculated:	\$193,548.39

Table 19: MCCCH S.I.P.S. Cost Savings Analysis