Multiple Activity Charts

Multiple Activity Charts (or Multi-Activity Charts) are a very useful tool for understanding the flow of work in a cyclical process and as a consequence understanding which resource is controlling the overall progress of the work. The tool can be used to model different scenarios to determine the optimum mix of resources for the work. The example below is based on using a tower crane to lift concrete from the street to a high floor for placing. Each resource is represented by a column; time is on the vertical axis.

Time	Truck & Crew	Crane & Skip	Placing Crew	Finishing Crew
1 min	Fill skip	Skip filling	Wait	Wait
2 min				
3 min	Wait	Hoist Skip		
4 min		Skip emptying	Place and compact concrete	
5 min				Smooth and finish concrete
6 min		Lower skip	Wait	
7 min	Fill skip	Skip filling		
8 min				
9 min	Wait	Hoist Skip		
10 min		Skip emptying	Place and compact concrete	Wait
11 min				Smooth and finish concrete
12 min		Lower skip	Wait	
13 min	Fill skip	Skip filling		

In this example, the crane (or more accurately the crane skip) is critical. On way to reduce the cycle would be to use two skips. One skip could be being filled while the other is emptied and all that would be needed is a few seconds to change over the crane hook when the newly emptied skip is lowered to the ground.

Time	Truck & Crew	Skip 1	Skip 2	Crane	Placing Crew	Finishing Crew
1 min	Fill skip 1	Skip filling				
2 min						
3 min	Fill skip 2	Hoist Skip	Skip filling	Hoist Skip 1		
4 min		Skip emptying		Skip 1 emptying	Place S1 concrete	
5 min						Smooth and finish concrete
6 min		Lower skip		Lower skip 1		
7 min	Fill skip 1	Skip filling		Change Hook		
8 min			Hoist Skip	Hoist Skip 2		
9 min			Skip emptying	Skip 2 emptying	Place S2 concrete	Smooth and finish concrete
10 min						
11 min			Lower skip	Lower skip 2		
12 min	Fill skip 2		Skip filling	Change Hook		
13 min		Hoist Skip		Hoist Skip 1		
14 min		Skip emptying		Skip 1 emptying	Place S1 concrete	Smooth and finish…..
15 min						

We have now reduced the cycle from 6 minutes to 5 minutes per load at the cost of hiring an additional concrete skip. The cycle could be further reduced if the hook change time is minimised. This may not sound much but if there were 30 skip loads of concrete in the pour and the cycle time could be reduced from 6 minutes to 4, the hour saved would reduce the cost of the pour by around $2,000 to $3,000. The next question though is how would the finishing crew manage? They are now working 100% of the time and arrangements may be needed for the placing crew to help them keep up with the increased pour rate.

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Multiple Activity Charts a very simple technique that can provide valuable insights to help optimise any cyclical process that involves several different resources. They can also provide a valuable tool for monitoring progress in critical situations where a detailed understanding of the workflow is needed.

The difference between this type of analysis and barcharts or CPM networks is the focus is on optimising resource usage in a repetitive / cyclical process. Once the resource usage and cycle time are optimised, the resulting overall duration can be incorporated into the main project schedule or Line-of-Balance (LOB) chart.

Another key difference between Multiple Activity Charts and bar charts is the time unit. Multiple Activity Charts typically work in hours or minutes (and occasionally fractions of minutes). Barcharts typically have a timescale of days and weeks.

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