# **ENGINUITY TUTORIAL**



**Completing Jobs Early** 

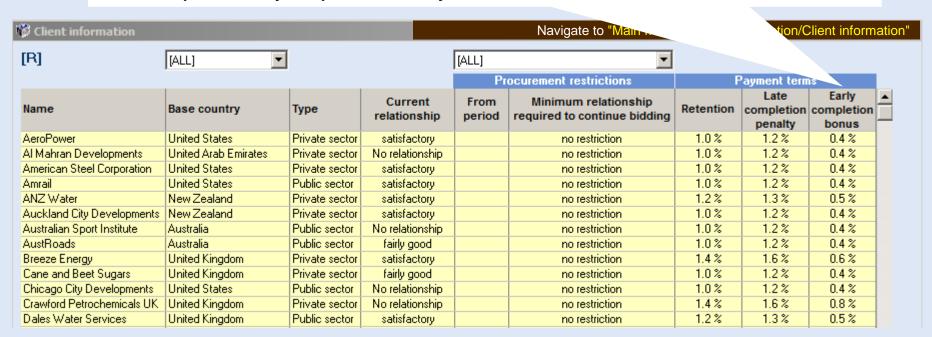
Trying to complete a job early has a number of benefits to the company, including :-

- The client may pay a bonus for early completion.
- The **company's own labour** that was being used on the completed job can be used on other sites, preventing the need to take on new recruits, or having to use subcontractors.
- The project manager on site can be relocated to another job, preventing the need to employ a new one, which incurs recruitment costs'
- The **company's capital assets** (plant, buildings etc) being used on the job can be diverted elsewhere.
- Cash flows are improved as any profit made from the job is earned quicker.

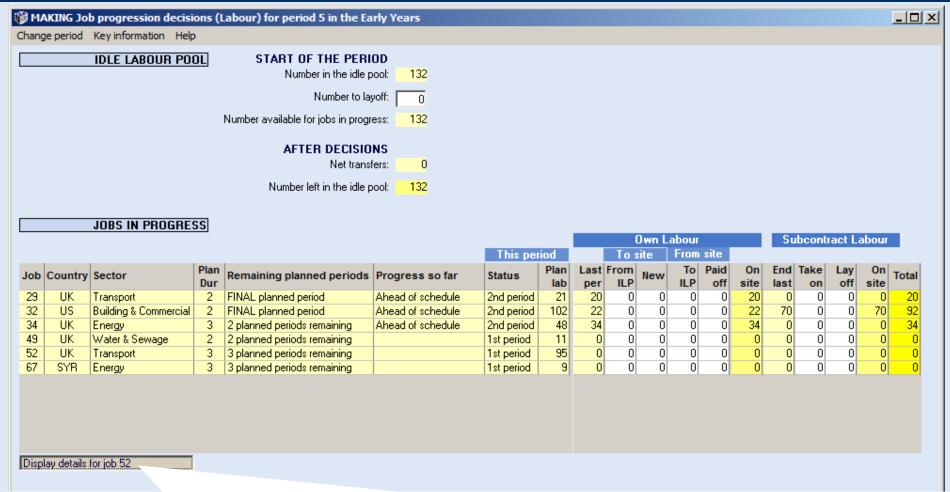


Early completion of a job means **completing at least one period before the end of the planned duration** e.g., if the planned duration is 4 periods, it must be completed in 3 periods or less to obtain the client bonus.

The bonus paid for early completion varies by client.







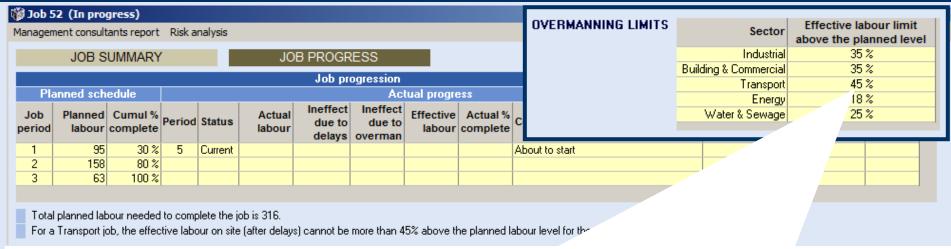
Consider the following example.

It is period 5, and job 52, a Transport contract that has a planned duration of 3 periods, is in its first period.

What overmanning strategy needs to be adopted to try and complete the job in 2 periods, and complete early?

We can use the **Display details for job 53** option to investigate further.





To complete a job early the Construction Manager needs to refer to the sector-based overmanning limits defined in the **Industry** parameters.

For job 52, a Transport contract, it can be overmanned above the planned level by up to 45% each period.

If the Construction Manager follows the overmanning guidelines, and the labour allocated to site is fully effective, with no delays, the completion schedule should be as follows.

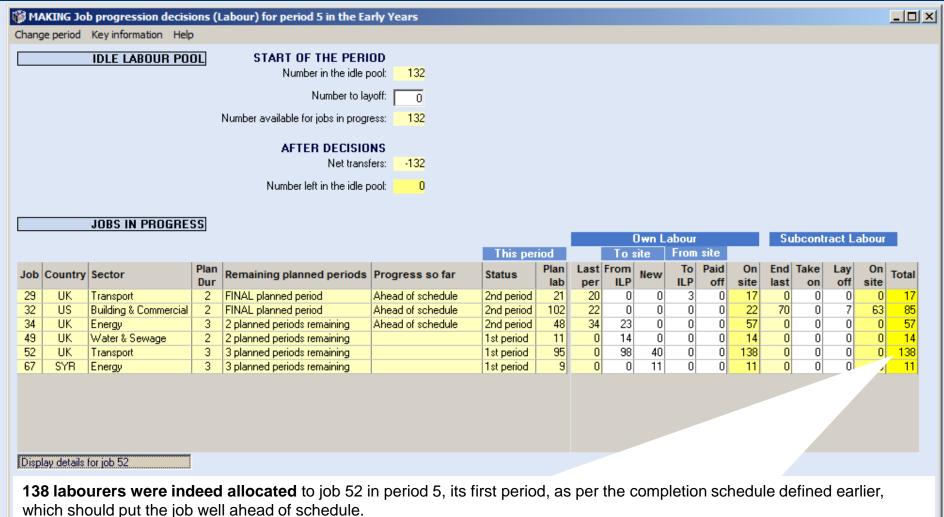
	< Planned / Labour Limits→			< Labour Allocation	
Job Period	Planned	Overmanning %	Effective Labour Limit	Labour Allocated	Cumulative
1	95	45%	138	138	138
2	158	45%	229	178	316
3	63				
	316				

The job should complete a period early, earning a bonus from the client, but was and how was this achieved in practice?

#### **KEY POINTS**

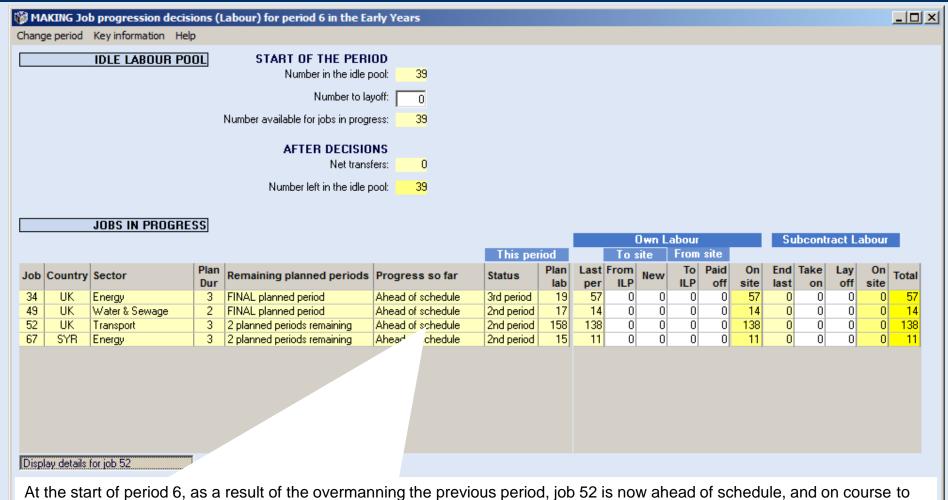
Overmanning above the effective labour limits results in ineffective labour that does not contribute to the progress of the job, but incurs labour costs.





We can move onto period 6 to see if this is the case.



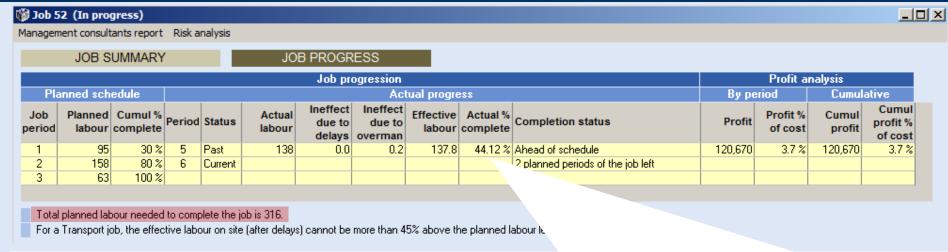


The question is, what level of labour is now needed to try and complete the job in its second period, and hence complete a period early and earn a bonus from the client?

We can use the **Display details for job 52** option to investigate further.

complete in 2 periods, a period earlier than the planned.





The **Job progress** for the job shows that the job was 44.12% complete at the end of the last period, and well ahead of the planned schedule of 30%. There is just **55.88%** of the job left to complete.

The **total planned labour required to complete the job is 316 man periods**. Since there is 55.88% of the job left to complete, in manpower terms this is 55.88% of the total labour of 316, or 176.58 labourers.

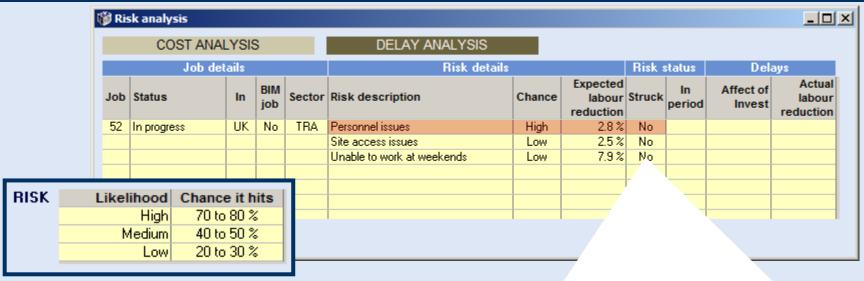
176.58 labourers should be sufficient for the job to complete, **BUT there is a key factor that could prevent this from happening**, and that is delays caused by risks striking.

To determine if any risks may delay job the job in its final period we can use the Risk analysis option at the top of the screen.

#### **KEY POINTS**

In the original completion strategy 178 labourers were needed to complete the job in its second period, but only 177 are now (before risk adjustment). This is because the job is slightly further ahead of schedule than expected due to the company employing an excellent project manager who improve the productivity of the labour on site.





The **Risk analysis** for job 52 reveals that there are 3 risks that have not yet struck, and which could delay the job if they were to strike, the delay causing a reduction in the labour on site :-

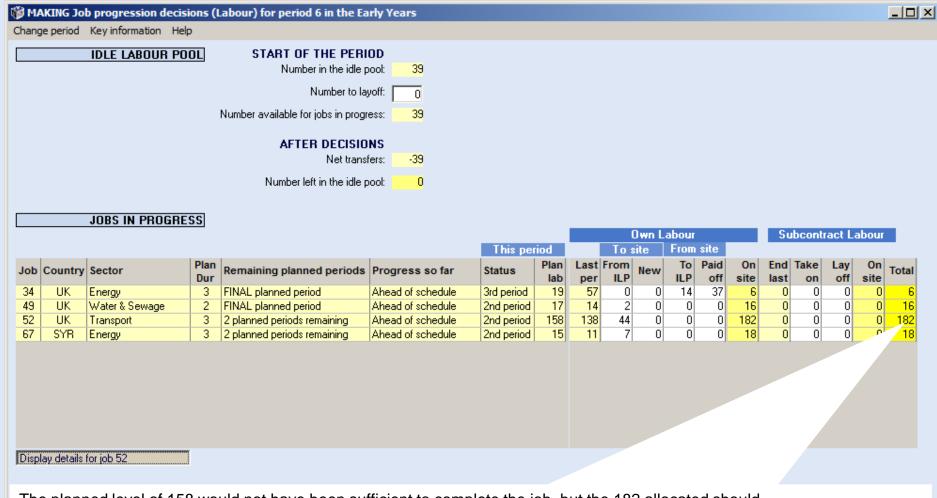
- 'Personnel issues', which has a 'high' chance of occurring, and an expected labour reduction of 2.8%
- 'Site access issues', which has a 'low' chance of occurring, and an expected labour reduction of 2.5%
- 'Unable to work at weekends', which has a 'low' chance of occurring, and an expected labour reduction of 7.9%

The **Industry parameters** show the chance a risk may strike for each likelihood level.

Although all the risks could strike, and potentially delay the job, **the 'Medium' and 'High' risks are most likely**, and the Construction Manager decides to take action in case this happens.

Since a 2.8% delay is expected if the 'high' risk strikes, the required labour level of 176.58 is adjusted in case of the 2.8% delay, giving a revised labour level of 181.66 labourers (176.58 / 0.972). Since we cannot have fractions of people, the labour level is adjusted upwards to 182 labourers.





The planned level of 158 would not have been sufficient to complete the job, but the 182 allocated should.

Crucially the 182 labourers is also within the overmanning limit for the period i.e., planned labour x overmanning %, or 158 x 1.45 = 229.

If this had not been the case, the job could not finish early.

Did the job go on to complete early?



For job 52, a completion ratio of 0.96 is excellent.

#### Completing Jobs Early

#### Job 52 (Completed early) Management consultants report Risk analysis JOB PROGRESS JOB SUMMARY Profit analysis Job progression Planned schedule By period Actual progress Cumulative Planned Cumul % Period Status Ineffect Ineffect Cumul Job Actual Effective Actual % Profit % Cumul Completion status Profit due to due to profit % labour complete labour labour complete of cost profit period delays overman of cost 137.8 44.11 % Ahead of schedule 3.6 % 119,996 3.6% 30 % Past 138 0.0 0.2 119,996 158 80 % Past 182 0.0 0.0 182.0 100 % Completed early 221.068 5.3 % 341,064 4.6% 63 100 % Total planned labour needed to complete the job is 316. For a Transport job, the effective labour on site (after delays) cannot be more than 45% above the planned labour level for the period. PERIOD 6 CLICK ON A LINE IN THE THE SUMMARY ABOVE TO SHOW THE DETAILS FOR EACH PERIOD THE JOB HAS BEEN PROGRESSED LABOUR ANALYSIS COST ANALYSIS VALUE AND PROFIT ANALYSIS Measured value: 4,321,590 ? The job did complete early, and earned a bonus of 54,130 from the client for Early completion bonus: 54,130 completing early. 4,375,720 Total value: 4,154,652 Total cost: Total profit: 221,068 (5.3 % of costs) **KFY POINTS** The **Completion Ratio** is a very useful measure of how effectively a job is PROGRESS TO DATE completed. 100 % √eted: (Ahead of schedule) It ranges from 0 to 1, and the nearer it is to 1 the nearer the end of the period, <sup>241,064</sup> (4.6 % of costs) Cumulauve p. .. and more cost effectively, it finishes. Completion ratio: 0.96 If a job finishes too early in the period :-? The workforce is retained until the end of the period, incurring unnecessary additional costs Excess labour is being used on the site that could have been utilised elsewhere