ENGINUITY TUTORIAL

Handling Job Delays

Handling Job Delays

The **effectiveness of labour** allocated to a job by the Construction Manager can be adversely affected by a number of factors, such as :-

- The expertise of the project manager on the site
- Labour relations
- Overmanning of the site

There is also another key factor that the Construction Manager needs to take into account, and that is **delays to the job caused by risks striking**.

We will at how the Construction Manager can mitigate against the consequences of job delays.

Handling Job Delays

Navigate to "Main menu/Making decisions/Job progression decisions (Labour)/Display job details"

Job 106 (In progress)

Management consultants report Risk analysis

JOB SUMMARY JOB PROGRESS

Job progression											Profit analysis			
Planned schedule			Actual progress								By period		Cumulative	
Job period	Planned labour	Cumul % complete	Period	Status	Actual labour	Ineffect due to delays	Ineffect due to overman	Effective labour	Actual % complete	Completion status	Profit	Profit % of cost	Cumul profit	Cumul profit % of cost
1	68	25 %	7	Past	80	5.4	0.0	74.6	28.16 %	Ahead of schedule	165,909	3.0 %	165,909	3.0 %
2	81	55 %	8	Past	96	0.0	0.4	95.6	64.27 %	Ahead of schedule	498,526	7.4 %	664,435	5.5 %
3	81	85 %	9	Past	96	9.2	0.0	86.8	96.77 %	Ahead of schedule	110,051	1.7 %	774,486	4.2 %
4	41	100 %	10	Current						FINAL planned period of the job				

Total planned labour needed to complete the job is 271.

For a Energy job, the effective labour on site (after delays) cannot be more than 18% above the planned labo

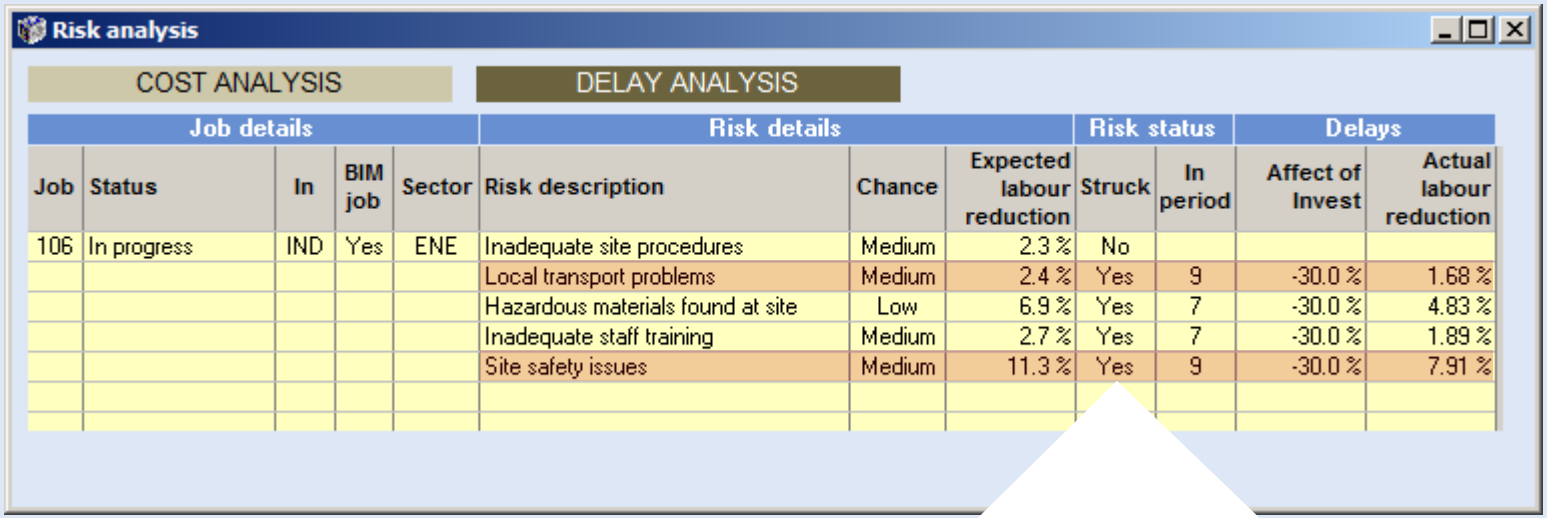
Consider the following example.

The intention was to complete job 106, an **Energy job**, in period 9, a period earlier than the planned duration of 4 periods, and receive a bonus from the client for early job completion. To achieve this 96 labourers were allocated to site.

However, the effective level of labour **was reduced by 9.2 due to delays caused by risks striking**. This resulted in the job being 96.77% complete at the end of period 9, and not quite completing.

We will now look in more detail at what caused the risk delays using the **Risk analysis** option at the top of the screen, and what action could have been taken to mitigate against their affect in order to complete the job a period early.

Handling Job Delays



Job details					Risk details			Risk status		Delays	
Job	Status	In	BIM job	Sector	Risk description	Chance	Expected labour reduction	Struck	In period	Affect of Invest	Actual labour reduction
106	In progress	IND	Yes	ENE	Inadequate site procedures	Medium	2.3 %	No			
					Local transport problems	Medium	2.4 %	Yes	9	-30.0 %	1.68 %
					Hazardous materials found at site	Low	6.9 %	Yes	7	-30.0 %	4.83 %
					Inadequate staff training	Medium	2.7 %	Yes	7	-30.0 %	1.89 %
					Site safety issues	Medium	11.3 %	Yes	9	-30.0 %	7.91 %

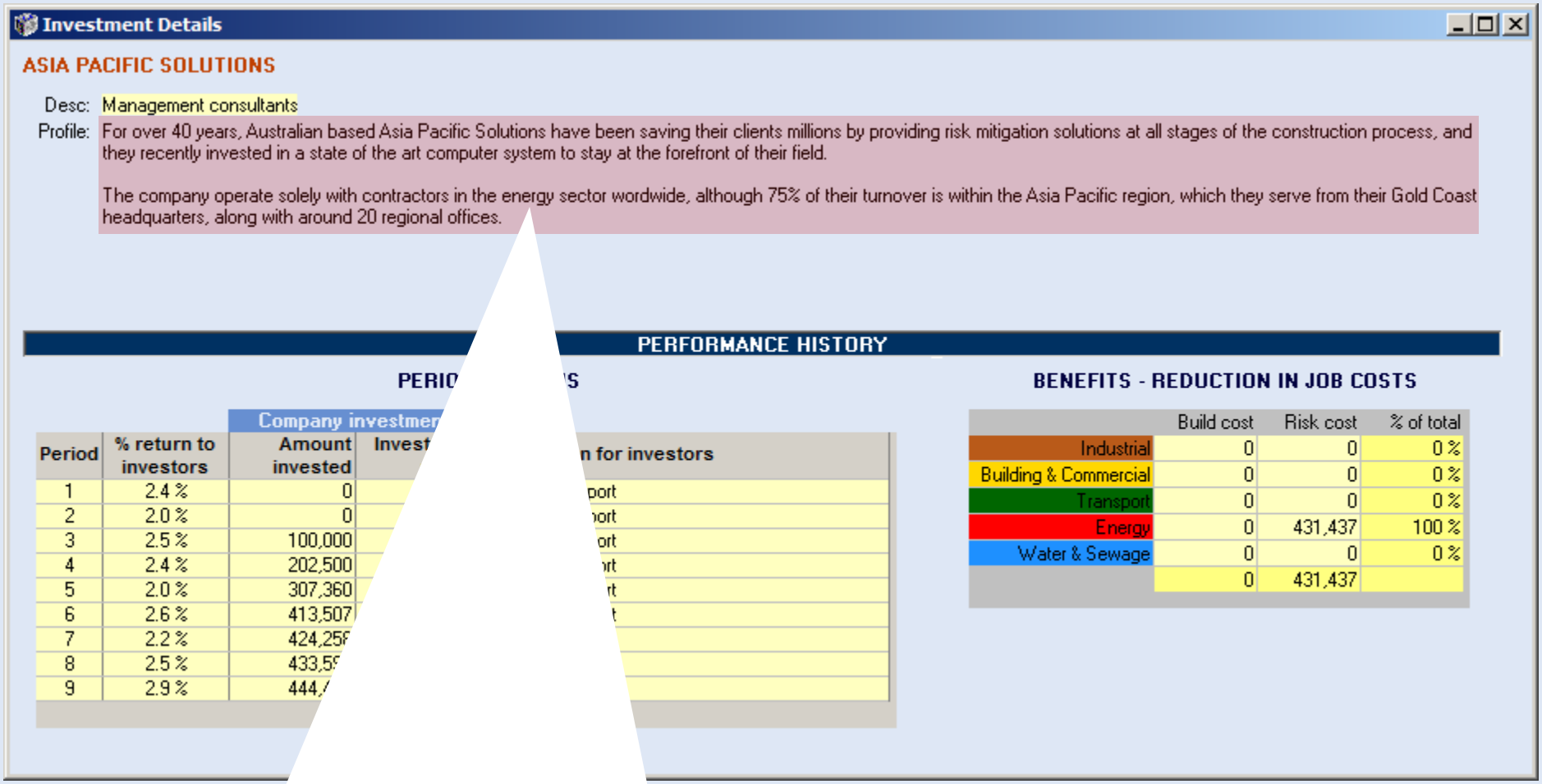
The **Risk analysis** reveals that the delays to the job in period 9 were caused by 'Local transport problems' and 'Site safety issues'.

The combined delay should been a labour reduction of 13.7% (2.4% + 11.3%), but targeted investments on the Financial Decisions Screen reduced the labour reduction by 30% to 9.59%.

KEY POINTS

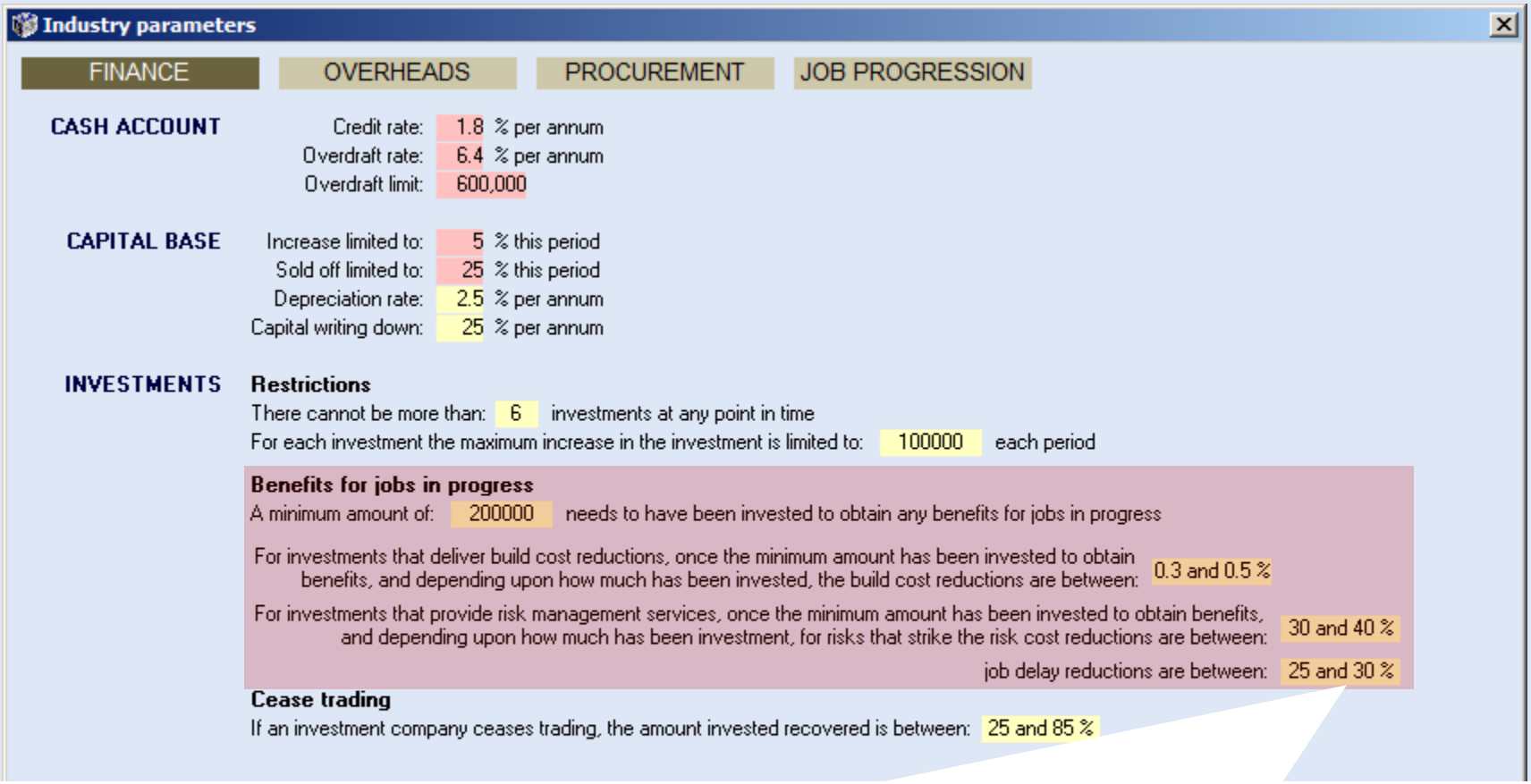
- More than one risk can strike in any period of a job, **but they only occur during the planned duration of a job, and not if it overruns**.
- Completing a job at least one period early can prevent risks striking in future periods.

Handling Job Delays



The targeted investment that reduced the job delay was in Asia Pacific Solutions, whose profile clearly shows that they have built up an enviable global reputation for risk management solutions to contractors in the Energy sector of the construction industry, which job 106 is.

Handling Job Delays



The **Industry parameters** reveal that if at least 200,000 is invested into companies that provide risk management services for the construction industry, job delays can be reduced by between 25 and 30%, as has been achieved by the investment in Asia Pacific Solutions.

KEY POINTS

There are 2 tiers of cost reductions, a lower and upper tier. You are not told the investment required to obtain the upper tier saving, and this knowledge can only be acquired as time progresses, but there is a linear increment between the two tiers as the investment increases.

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Job 106 (In progress)

Management consultants report Risk analysis

JOB SUMMARY JOB PROGRESS

Job progression											Profit analysis			
Planned schedule			Actual progress								By period		Cumulative	
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3	81	85 %	9	Past	96	9.2	0.0	86.8	96.77 %	Ahead of schedule	110,051	1.7 %	774,486	4.2 %
4	41	100 %	10	Current						FINAL planned period of the job				

Total planned labour needed to complete the job is 271.

For a Energy job, the effective labour on site (after delays) cannot be more than 18% above the planned labour level for the period.

PERIOD 9 CLICK ON A LINE IN THE THE SUMMARY ABOVE TO SHOW THE DETAILS FOR EACH PERIOD THE JOB HAS BEEN PROGRESSED

LABOUR ANALYSIS

PLANNED SCHEDULE

Required labour:	81	
Overmanning of:	18	% permitted
Effective labour limit (ELL):	95.6	

LABOUR ALLOCATED

Own:	96	
Sub:	0	
Total labour allocated:	96	
(less) labour lost by delays:	9.2	(ineffective)
Effective level after delays:	86.8	
(less) overmanning above the ELL:	0	(ineffective)
Effective labour on site:	86.8	

COST ANALYSIS

BUILD RELATED

Build cost:	4,985,314	?
Site cost:	1,106,688	?
Risk cost:	2[illegible]3,491	?
Late completion penalty:	0	

ADDITIONAL LABOUR COSTS

Ineffective labour due to overmanning	0
Ineffective labour due to completing the i	0
Training new recruits [I	0
Labour payoff	0
Subcontr	0

PROJECT

	n Garvey	?
0	cellent	
	13,000	
	520	(4 %)
	0	
	0	
	0	

VALUE AND PROFIT ANALYSIS

Measured value:	6,494,064	?
Early completion bonus:	0	
Total value:	6,494,064	
Total cost:	6,384,013	
Total profit:	110,051	(1.7 % of costs)

PROGRESS TO DATE

Amount of the job completed:	96.77	%
Progress comment:	(Ahead of schedule)	
Cumulative profit:	774,486	(4.2 % of costs)

All labour on site incurs site cost, including ineffective labour, and hence the **cost of any delays is incorporated into the site cost for the period**.

Handling Job Delays

MAKING Job progression decisions (Labour) for period 9 in the Early Years

Change period Key information Help

IDLE LABOUR POOL

START OF THE PERIOD

Number in the idle pool: 77

Number to layoff: 0

Number available for jobs in progress: 77

AFTER DECISIONS

Net transfers: -40

Number left in the idle pool: 37

JOBS IN PROGRESS

						This period		Own Labour						Subcontract Labour				
									To site	From site								
Job	Country	Sector	Plan Dur	Remaining planned periods	Progress so far	Status	Plan lab	Last per	From ILP	New	To ILP	Paid off	On site	End last	Take on	Lay off	On site	Total
106	IND	Energy	4	2 planned periods remaining	Ahead of schedule	3rd period	81	96	0	0	0	0	96	0	0	0	0	96
121	UK	Transport	4	2 planned periods remaining	Ahead of schedule	3rd period	99	137	0	0	0	72	65	7	0	7	0	65
146	US	Energy	4	3 planned periods remaining	Ahead of schedule	2nd period	37	34	9	0	0	0	43	1	0	0		44
173	UK	Energy	4	4 planned periods remaining		1st period	26	0	31	0	0	0	31	0	0		0	31

Delays that occur in the periods before a job is due to complete are not such a concern, apart from the additional site cost. HOWEVER, delays that occur in the period a job is due to complete can be costly because they can prevent a job from completing, with associated late completion penalties, and a waste of resources in terms of the further labour and a project manager to complete the job.

Gong back to the previous period, how could the Construction Manager adjust the labour on site for job 106 to mitigate against the affect of any potential delays ?

Handling Job Delays

Navigate to "Main menu/Making decisions/Job progression decisions (Labour)/Display job details/Risk analysis"

Risk analysis

COST ANALYSIS | DELAY ANALYSIS

Job details					Risk details			Risk status		Delays	
Job	Status	In	BIM job	Sector	Risk description	Chance	Expected labour reduction	Struck	In period	Affect of Invest	Actual labour reduction
106	In progress	IND	Yes	ENE	Inadequate site procedures	Medium	2.3 %	No			
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					Hazardous materials found at site	Low	6.9 %	Yes	7	-30.0 %	4.83 %
					Inadequate staff training	Medium	2.7 %	Yes	7	-30.0 %	1.89 %
					Site safety issues	Medium	11.3 %	No			

RISK

Likelihood	Chance it hits
High	70 to 80 %
Medium	40 to 50 %
Low	20 to 30 %

The **Risk analysis** for job 106 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 :-

- 'Inadequate site procedures', which has a **'medium'** chance of occurring, and an expected labour reduction of 2.3%
- 'Local transport problems', which has a **'medium'** chance of occurring, and an expected labour reduction of 2.4%
- 'Site safety issues', which has a **'medium'** chance of occurring, and an expected labour reduction of 11.3%

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

Since the risks all have a medium chance of occurring, the Construction Manager decides to take action in all 3 cases.

The combined delay is expected to be 16% if all the risks strike, but the investment in the Asia Pacific Group should reduce the delay by 30% i.e., from 16% To 11.2%. Hence, the required labour level of 96 is adjusted in case of the 11.2% delay, giving a revised labour level of 108.1 labourers (96 / 0.888). Since we cannot have fractions of people , the labour level is adjusted upwards to 109.

KEY POINTS

Targeted investments on the Financial Decisions Screen into risk management companies can reduce the delays caused when risks strike, and reduce the amount of additional labour added to compensate for potential delays.

Handling Job Delays

MAKING Job progression decisions (Labour) for period 9 in the Early Years

Change period Key information Help

IDLE LABOUR POOL

START OF THE PERIOD

Number in the idle pool: 77

Number to layoff: 0

Number available for jobs in progress: 77

AFTER DECISIONS

Net transfers: -54

Number left in the idle pool: 23

JOBS IN PROGRESS

						This period		Own Labour						Subcontract Labour				
									To site	From site								
Job	Country	Sector	Plan Dur	Remaining planned periods	Progress so far	Status	Plan lab	Last per	From ILP	New	To ILP	Paid off	On site	End last	Take on	Lay off	On site	Total
106	IND	Energy	4	2 planned periods remaining	Ahead of schedule	3rd period	81	96	13	0	0	0	109	0	0	0	0	109
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146	US	Energy	4	3 planned periods remaining	Ahead of schedule	2nd period	37	34	10	0	0	0	44	1	0		0	44
173	UK	Energy	4	4 planned periods remaining		1st period	26	0	31	0	0	0	31	0			0	31

The adjusted labour level of 109 labourers should compensate if all of the risks strike, and enable the job to complete on time.

KEY POINTS

If the delays do not occur the job will complete earlier than the end of the period, and as all labour is retained on site until the end of the period when a job completes, there will be additional labour costs due to the ineffective labour. **However, at least the job will have completed.**