OR-AS Operations Research Applications and Solutions	Case Name: **Manufacturing Tool Cost Module**	Sector	IT (Electronics)
	OR-AS Operations Research - Applications and Solutions www.or-as.be info@or-as.be	Baseline Schedule	Schedule with resources Schedule with costs
		Risk Analysis	Random simulation One of nine std. scenarios User defined distributions
Submitted by	Jolien Commeene		
Date	May 14, 2012	Project Control	Automatic tracking Tracking based on user input
File Name	C2012-01 Manufacturing Tool Cost Module.p2x		

1. Project description

Project authenticity

TE Connectivity in Oostkamp (Belgium) produces electromechanical components for the automotive sector. This project aims at ensuring the quality of the molds used in the process through the design of a calculation module that determines which molds have the highest cost and therefore should be treated first.

The project consists of activity, resource and cost data that were obtained directly from the actual project owner.

2. Project properties

2.1. Baseline Schedule

General	
# Activities	29
Planned Duration (PD)	45 days*
Budget At Completion (BAC)	61.699 €
Renewable Resources	5
Consumable Resources	-

Network topology	
Serial/Parallel (SP)	79%
Activity Distribution (AD)	78%
Length of Arcs (LA)	10%
Topological Float (TF)	11%

* standard eight-hour working days

2.2. Risk Analysis

Random simulation by ProTrack was performed using the default symmetric triangular risk distribution profiles.

	Cost sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	0.0	0.0	N/A
CRI-rho	100.0	0.0	N/A
CRI-tau	100.0	0.0	N/A

	Resource sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	0.0	0.0	N/A
CRI-rho	100.0	0.0	N/A
CRI-tau	100.0	0.0	N/A

	Time sensitivity		
	avg [%]	std dev [%]	skew [-]
CI	80.3	37.6	-1.6
SI	64.9	44.8	-0.7
SSI	13.6	15.6	0.7
CRI-r	11.7	12.6	0.7
CRI-rho	31.9	17.2	-0.3
CRI-tau	48.1	43.3	0.3

The remarkable results for cost and resource sensitivity can be explained by the absence of activity costs and variable resource costs.

2.3. Project Control

2.3.1. Simulated forecasting accuracy

The accuracy of time and cost forecasting methods has been evaluated based on Monte Carlo simulation runs using the risk profiles described in section “2.2. Risk Analysis”. Based on these risk profiles, the Mean Absolute Percentage Error (MAPE) and Mean Percentage Error (MPE) have been calculated to evaluate the expected accuracy of the time and cost predictions, EAC(t) and EAC, respectively.

Simulated EAC(t) accuracy		
method - PF	MAPE [%]	MPE [%]
PV - 1	11.3	-9.8
PV - SPI	11.4	-9.7
PV - SCI	11.4	-9.7
ED - 1	11.3	-9.9
ED - SPI	11.4	-9.7
ED - SCI	11.4	-9.7
ES - 1	12.0	-11.8
ES - SPI(t)	19.6	-19.1
ES - SCI(t)	19.6	-19.1

Simulated EAC accuracy		
method (PF)	MAPE [%]	MPE [%]
1	N/A	N/A
CPI	N/A	N/A
SPI	N/A	N/A
SPI(t)	N/A	N/A
SCI	N/A	N/A
SCI(t)	N/A	N/A
0.8 CPI + 0.2 SPI	N/A	N/A
0.8 CPI + 0.2 SPI(t)	N/A	N/A

According to the MAPE values[1] the best performance for time forecasting can be expected from the Planned Value and Earned Duration methods. Cost forecasting is not relevant since there are only fixed resource costs in this project.

2.3.2. Tracking description

The user has not performed any project control and therefore no tracking periods have been defined. Tracking periods can now be generated automatically by ProTrack or by manually inputting tracking data period by period.

[1] The MAPE gives the best indication for the forecast accuracy (the lower the MAPE, the more accurate the method) since all deviations from the targeted real duration (real cost) are cumulated, whereas for the MPE underestimates can be compensated by overestimates and vice versa, possibly leading to an overly positive evaluation of a certain method. However, the MPE can provide useful information about the nature of the deviations, i.e. does the method rather underestimate or overestimate the real duration (real cost)?