

	Case Name: <b>Asti-Cuneo Highway</b>	Sector	Construction (Civil)
	<b>OR-AS</b> Operations Research - Applications and Solutions <a href="http://www.or-as.be">www.or-as.be</a> <a href="mailto:info@or-as.be">info@or-as.be</a>	<b>Baseline Schedule</b> Schedule with resources Schedule with costs	
Submitted by	Anna Bierma	<b>Risk Analysis</b> Random simulation One of nine std. scenarios User defined distributions	
Date	December 12, 2012		
File Name	C2012-04 Asti-Cuneo Highway.p2x	<b>Project Control</b> Automatic tracking Tracking based on user input	

## 1. Project description

Project authenticity

The construction of a new one mile long road section of the A33 highway Asti-Cuneo in Italy, including an overpass and a subway crossing.

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	67
Planned Duration (PD)	272 days*
Budget At Completion (BAC)	6,230,961 €
Renewable Resources	16
Consumable Resources	2

\* standard eight-hour working days

Network topology	
Serial/Parallel (SP)	63%
Activity Distribution (AD)	54%
Length of Arcs (LA)	0%
Topological Float (TF)	10%

### 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	9.4	12.7	3.2
CRI-rho	15.9	17.6	1.6
CRI-tau	33.0	28.4	1.3

	Resource sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	41.8	38.2	0.4
CRI-rho	41.1	38.4	0.4
CRI-tau	35.9	32.3	0.7

	Time sensitivity		
	avg [%]	std dev [%]	skew [-]
CI	62.5	47.3	-0.5
SI	67.2	42.7	-0.6
SSI	5.7	11.0	3.2
CRI-r	9.9	11.6	2.6
CRI-rho	11.3	11.4	2.4
CRI-tau	21.7	14.2	0.2

## 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	2.6	0.2
PV - SPI	3.0	0.6
PV - SCI	3.6	0.8
ED - 1	3.2	0.9
ED - SPI	3.0	0.5
ED - SCI	3.3	0.6
ES - 1	1.4	-0.5
ES - SPI(t)	1.7	-0.3
ES - SCI(t)	2.2	-0.2

Simulated EAC accuracy		
method (PF)	MAPE [%]	MPE [%]
1	0.4	-0.2
CPI	1.0	0.0
SPI	1.2	0.1
SPI(t)	1.2	0.0
SCI	2.0	0.2
SCI(t)	2.0	0.1
0.8 CPI + 0.2 SPI	1.0	0.0
0.8 CPI + 0.2 SPI(t)	1.0	0.0

According to the MAPE values<sup>1</sup> the best performance for time forecasting can be expected from the unweighted and SPI(t)-weighted Earned Schedule methods. For cost forecasting the unweighted method should yield the best results.

### 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.

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<sup>1</sup> 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)?