

Introduction to project risk management using @RISK for Project

2010 User Conference
Presented by Ian Wallace

Finance.xls [Compatibility Mode] - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Developer Add-Ins @RISK

Define Distributions Add Output Define Correlations Model Distribution Fitting Model Window Iterations 1000 Simulations 1 Start Simulation Advanced Analyses Browse Results Summary Define Filters Excel Reports Swap Functions Library Utilities Help

C10 =RiskOutput() ...

Financial Forecasting

This model demonstrates the analysis of uncertainty whether to launch a new product line. A simplified look as shown below. Since most of the elements they all involve uncertainty. The values in cells in formulas. The cells in red, the NPV value in cell C10 marked as @RISK outputs so a detailed analysis @RISK distributions to your financial models, you analysis that can lead to bad business decisions.

Year	2008
Cash Flow	
Total Revenue	\$
Cost of Goods Sold	\$

NPV (10%) \$363,248.03

@RISK - Results Summary

Simulation Results For Outputs: Inputs= 22, Outputs= 11

Name	Cell	Graph	Min	Mean	Max	5%	95%	Errors
Net Income / 2015	J22		-166581	246469.3	999854.9	29213.44	653548.6	0
Net Income / 2016	K22		-113779.1	247584	990937.9	30810.19	676444.9	0
Net Income / 2017	L22		-91443.77	254076.3	1040976	30617.88	706371.3	0
NPV (10%)	C10		-102415.5	441709.9	1381116	26967.12	956709.4	0

@RISK - Output: C10

NPV (10%)

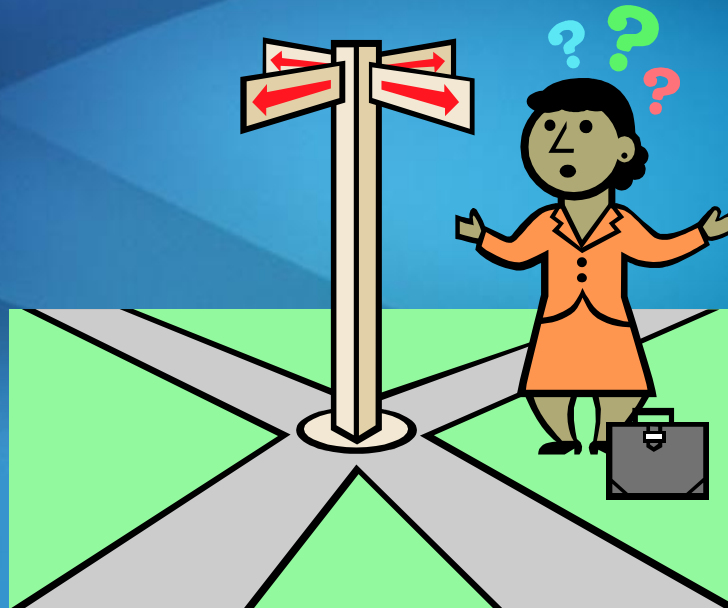
Values x 10⁻⁶

Values in Millions

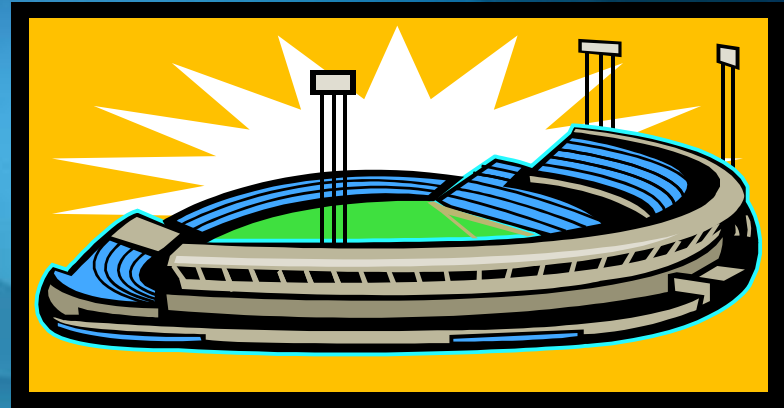
- Minimum -102415.4743
- Maximum 1381115.8076
- Mean 441709.9264
- Std Dev 302530.5024
- Values 1000

84,043.75	\$	141,787.50	\$	186,876.09	\$	295,421.10	\$	415,064.54
30,000.00	\$	20,000.00	\$	20,000.00	\$	20,000.00	\$	25,000.00
54,043.75	\$	121,787.50	\$	166,876.09	\$	275,421.10	\$	390,064.54
(126,331.25)	\$	(4,543.75)	\$	162,332.34	\$	275,421.10	\$	390,064.54
-	\$	-	\$	74,672.88	\$	126,693.70	\$	179,429.69
54,043.75	\$	121,787.50	\$	92,203.22	\$	148,727.39	\$	210,634.85
1		1		1		1		1
\$24.41		\$25.63		\$28.91		\$28.26		\$29.67
5%		5%		5%		5%		5%
46%		46%		46%		46%		46%
58.03		\$61.08		\$64.29		\$67.65		\$71.18
2500		4000		5000		7500		10000
-	\$	-	\$	-	\$	-	\$	-
10,000.00	\$	-	\$	-	\$	-	\$	-
20,000.00	\$	20,000.00	\$	20,000.00	\$	20,000.00	\$	25,000.00
30,000.00	\$	20,000.00	\$	20,000.00	\$	20,000.00	\$	25,000.00

Measuring confidence

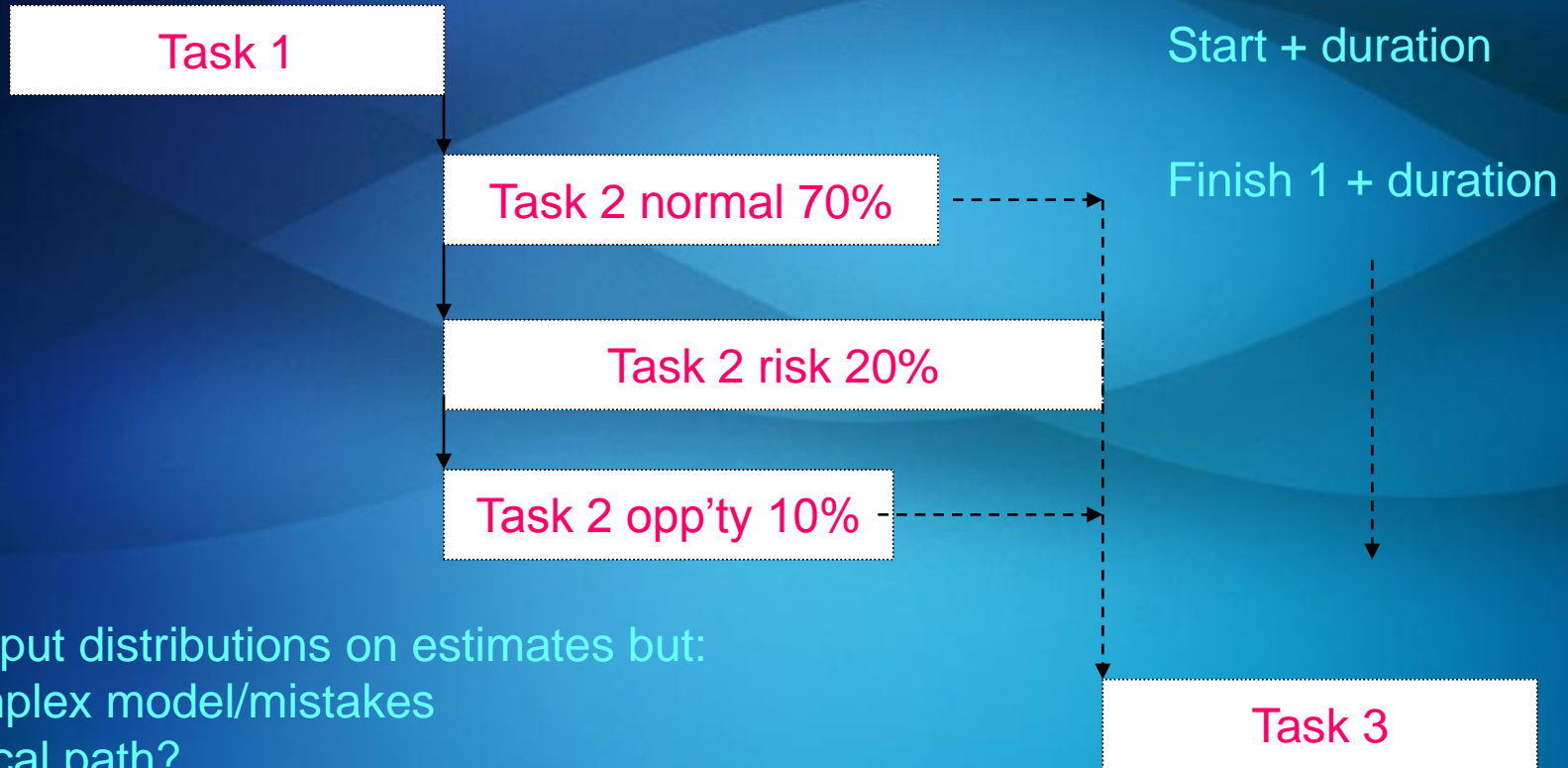


What about schedule?



What are the chances of being on-time?

Schedule analysis using Excel

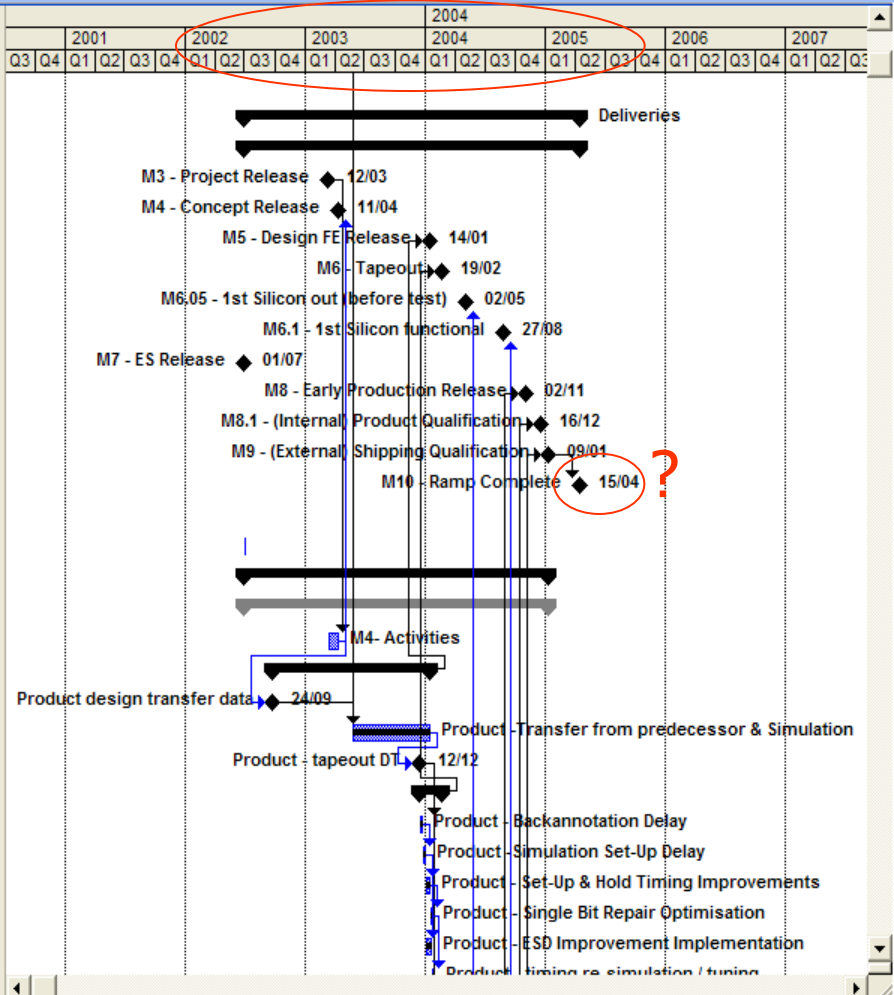


Can put distributions on estimates but:

- complex model/mistakes
- critical path?
- graphical analysis/communication?
- comparison/control with actuals?
- reporting?

- Calendar
- Gantt Chart
- Network Diagram
- Task Usage
- Tracking Gantt
- Resource Graph
- Resource Sheet
- Resource Usage

ID	Predecessors	Name	Start	Finish	Duration
5					
6		Deliveries	01/07/02	15/04/05	730 days
7		Product	01/07/02	15/04/05	730 days
8		M3 - Project Release	12/03/03	12/03/03	0 days
10	8	M4 - Concept Release	11/04/03	11/04/03	0 days
12	10	M5 - Design FE Release	14/01/04	14/01/04	0 days
14	12	M6 - Tapeout	19/02/04	19/02/04	0 days
16	14	M6.05 - 1st Silicon out (before test)	02/05/04	02/05/04	0 days
18	16	M6.1 - 1st Silicon functional	27/08/04	27/08/04	0 days
19		M7 - ES Release	01/07/02	01/07/02	0 days
21	19	M8 - Early Production Release	02/11/04	02/11/04	0 days
23	21	M8.1 - (Internal) Product Qualification	16/12/04	16/12/04	0 days
25	23	M9 - (External) Shipping Qualification	09/01/05	09/01/05	0 days
26	25	M10 - Ramp Complete	15/04/05	15/04/05	0 days
27					
28			01/07/02	01/07/02	1 day?
29		Product	01/07/02	09/01/05	660 days
30		Design	01/07/02	09/01/05	660 days
2	30	M4 - Activities	12/03/03	11/04/03	30 edays
6		M5 - Activities	24/09/02	14/01/04	341 days
7	6	Product design transfer data	24/09/02	24/09/02	0 days
9	7	Product - Transfer from predecessor	22/05/03	14/01/04	237 edays
10	9	Product - tapeout DT	12/12/03	12/12/03	0 days
13		M6 - Activities	13/12/03	19/02/04	49 days
14	13	Product - Backannotation Delay	13/12/03	24/12/03	8 days
15	14	Product - Simulation Set-Up Delay	25/12/03	31/12/03	1 wk
16	15	Product - Set-Up & Hold Timing Impr	01/01/04	14/01/04	2 wks
17	16	Product - Single Bit Repair Optimisa	15/01/04	21/01/04	1 wk
18	17	Product - ESD Improvement Impleme	01/01/04	21/01/04	3 wks
19	18	Product - timing re-simulation / tunin	21/01/04	30/01/04	9 edays



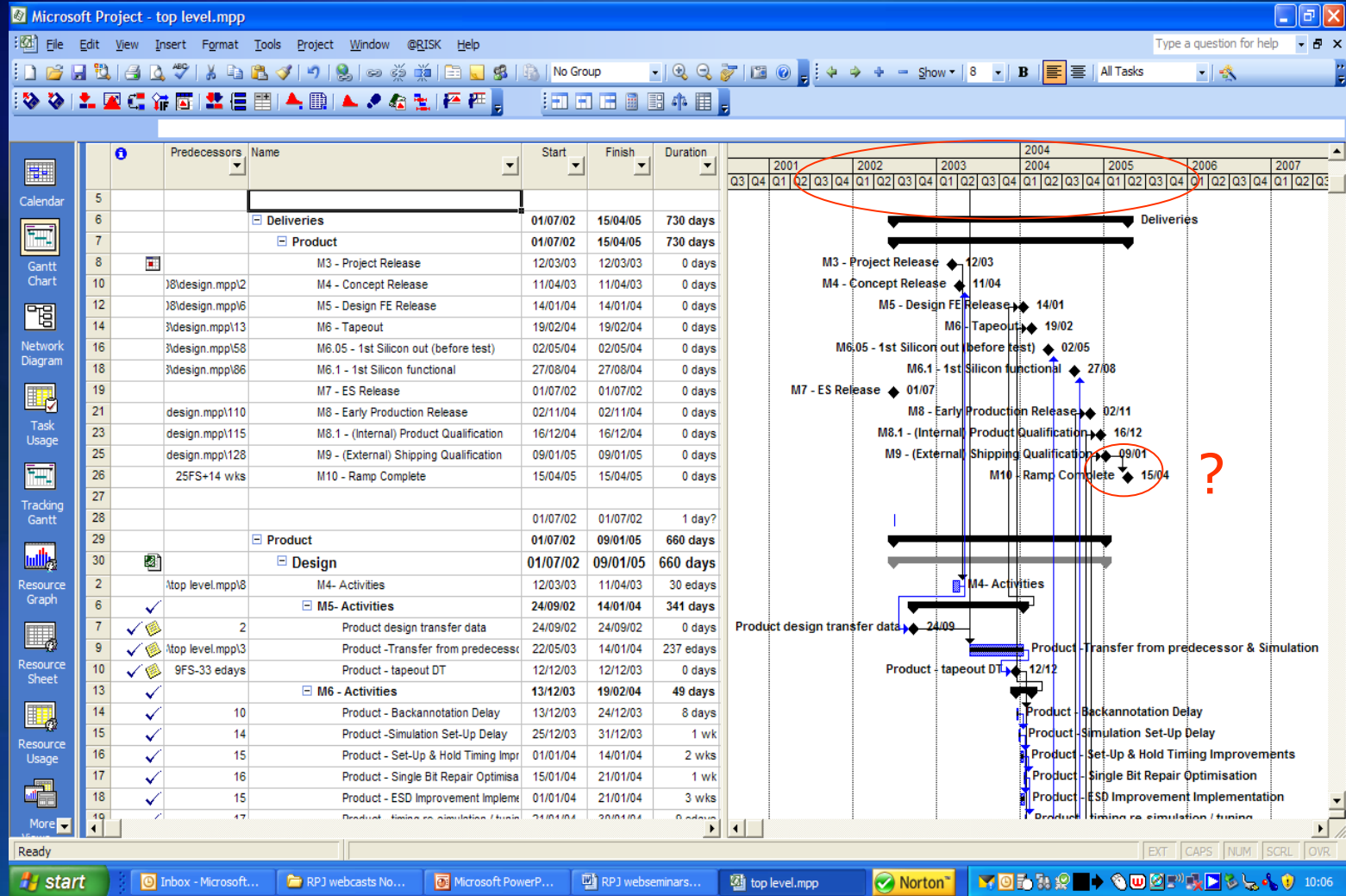
Project risk management

The 'risk register'

RISK REGISTER FOR PRODUCT DEVELOPMENT PROJECT

Risk	Impact description	Mitigation	Owner	Probability	Cost impact			Binomial	Pert	@RISK value
					Least	ML	Worse			
3rd party										
R1 - late customer requirement doc	Delayed start			50%	2000	5000	10000	1	5759	5759
R2 - late customer acceptance plan	Delayed finish			10%	2000	5000	10000	0.1	7462	746
Quality Control risks										
R3 - Inadequate customer requirements	Poor design/rework			10%	5000	10000	20000	0.1	5966	597
R4 - Design/solution QC	Rework design			20%	10000	50000	100000	0	14832	0
R5 - Ramp test QC fails	Rework design			10%	10000	50000	100000	0	30391	0
H&S risks										
R6 - Accident	Shut-down			1%	10000	50000	100000	0	54828	0
R7 - Pollution incident	Shut-down			1%	10000	50000	100000	0	57289	0
Technology risks										
R8 - Machine breakdown	Lost time			10%	5000	10000	20000	0	14725	0
R9 - Obsolescence	early finish			1%	10000	50000	100000	0	57205	0
Commercial risks										
R10 - Supplier bankruptcy	Delays			10%	10000	50000	100000	0.1	77674	7767
R11 - Customer bankruptcy	Delays			10%	10000	50000	100000	0	42873	0
R12 - Law suit/penalties	Delays			10%	10000	50000	100000	0	80153	0
Weather risks										
R13 - Raw material delays	Delayed production			10%	10000	50000	100000	0.1	46876	4688
									Total	19557

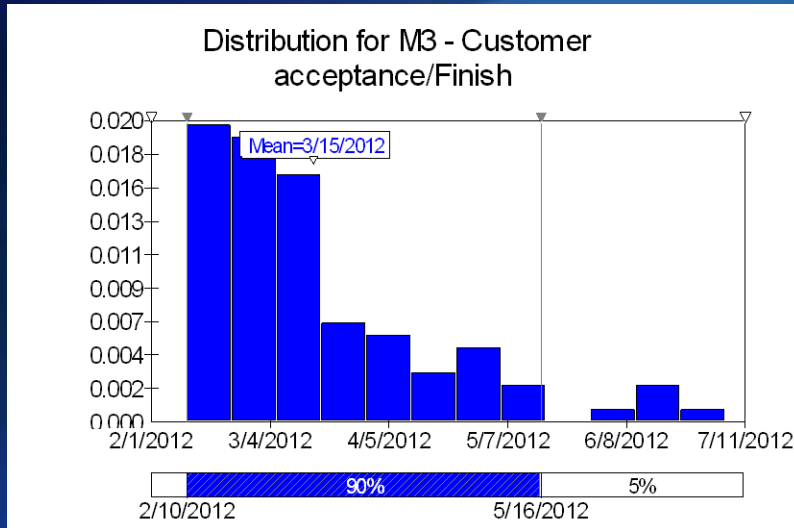
What about duration?



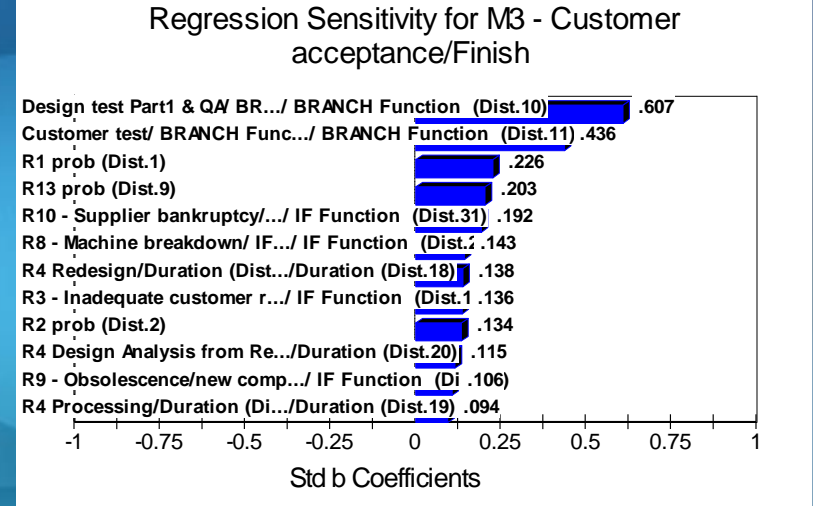
Use @RISK for Project to see the effect of the risk register on both cost and duration (in the same place)

Time-critical results

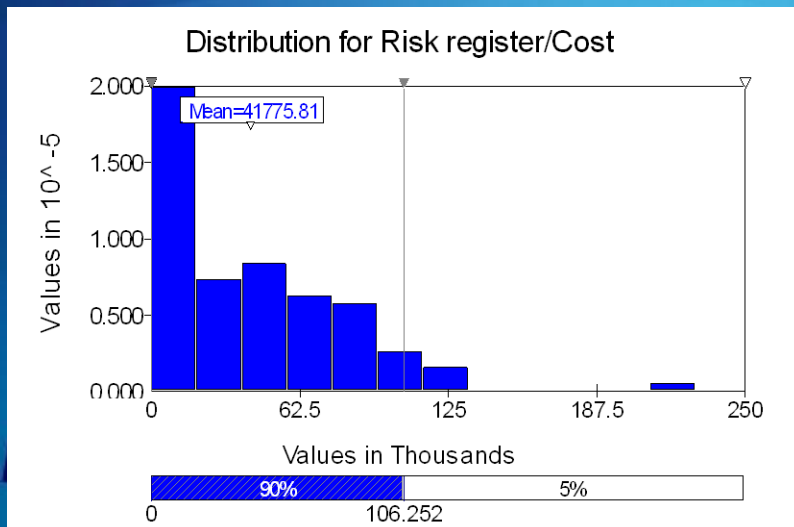
Finish Date



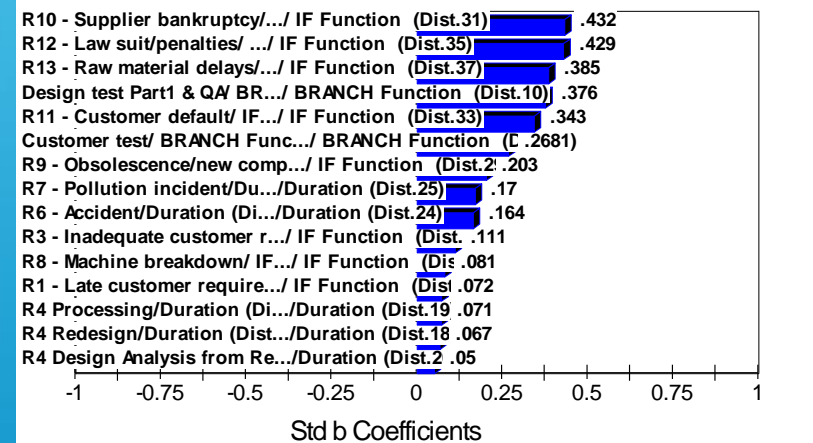
Tornado graphs



Project Cost



Regression Sensitivity for Risk register/Cost



Summary

@RISK for Project is all about making decisions and answering difficult questions:

- Is this a 'quality' plan?
- What is the margin of error?
- Have we enough budget?
- Have we enough time/what are the 'odds'?
- What can we do to reduce uncertainty?
- What price shall we quote?
- Is this the most risk efficient approach?
- What is the residual risk – do we need to off-lay/transfer?

Other features

- » Parameter entry tables for easier data entry
- » Risk categories instead of 'line by line'
- » Simtable – used to compare different scenarios/strategies
- » Field referencing (cell referencing as in Excel)
- » Probabilistic calendars – lost time/resource availability
- » Correlation – partial links/dependencies
- » Enablewhen – modifies global variables
- » Best fit – possible use for programme-level models

Questions?



E-mail: iwallace@palisade.com