SCHEDULE RISK ANALISYS

Seminario Gestione dei Rischi Associati al Contract Management –
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WHAT IS A RISK?

FOSTER WHEELER

WHAT IS A RISK?

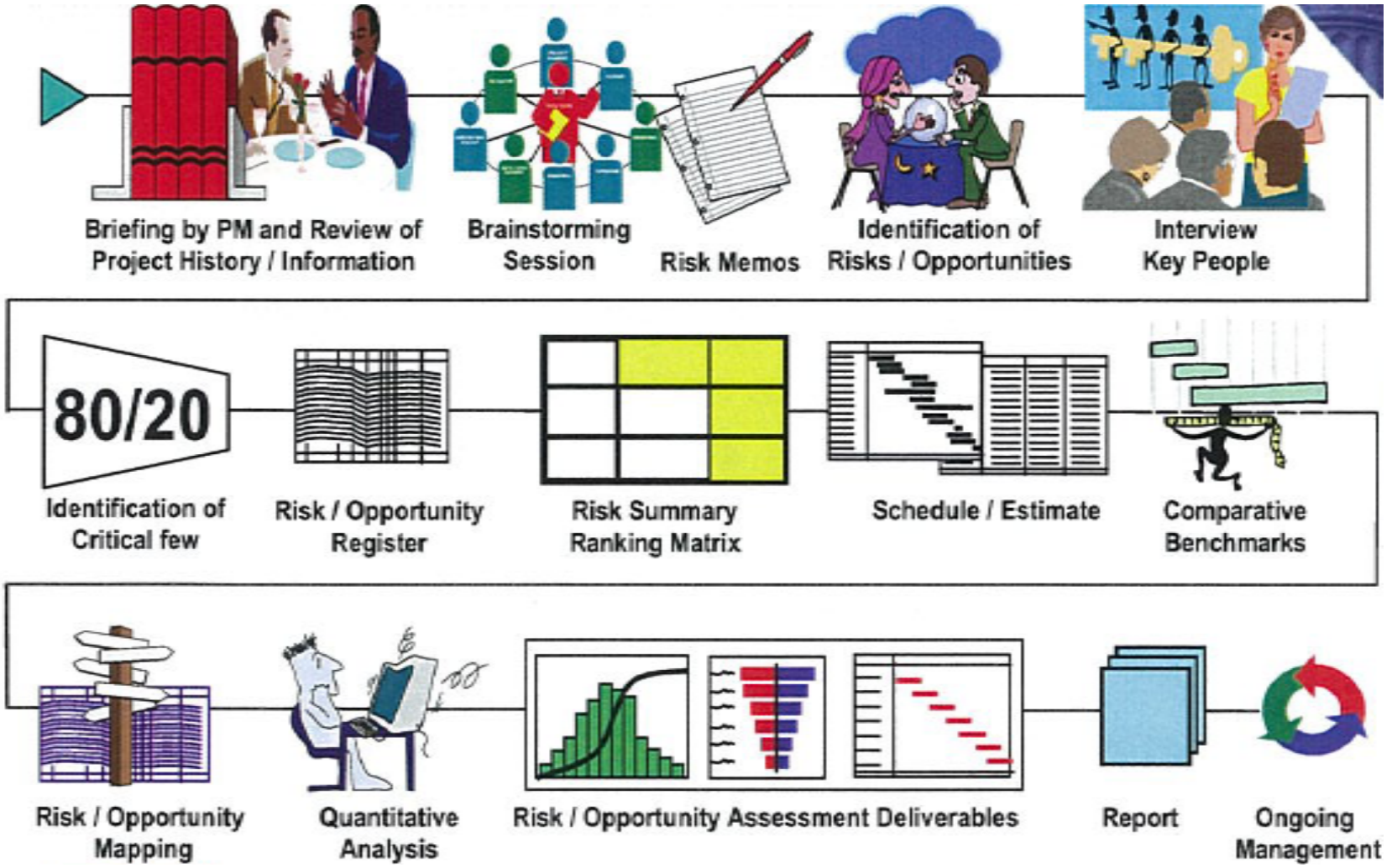
Generic definition

“ Exposure to an uncertain situation that could have an effect which is a deviation from the expected – positive or negative “

Project risk:

“ An uncertain event or set of circumstances that, should it occur, will have an effect on the achievement of one or more of the project objectives”

RISK ANALYSIS: PROCESS FLOW



THE CASE: PROJECT BRIEF DESCRIPTION

The following example is coming from a project executed by FWI, where several schedule risk analysis have been made to comply with the constraint of the client to fix a schedule with associated probability.

Key parameters:

- TIC 200 M€uro
- Original schedule duration 30Months

RISK ANALYSIS: BRAINSTORMING & RISK REGISTER

A brain-storming session to define risks was held by a joint team (Client and Foster Wheeler) from all disciplines: Engineering, Procurement, Construction, Operation, Maintenance, Project Control.

At the end of the brainstorming session a list of threats/ opportunities was developed

A restricted Group beared the responsibility to assign to each threat/opportunity a corresponding score of probability and magnitude .

RISK ANALYSIS: RISK REGISTER

Risk			Pre-mitigation			Response		Post-mitigation		
ID	Type	Title	Probability	Schedule	Score	Type	Title	Probability	Schedule	Score
R04	Threat	Contractors not familiar with safety rules	VH	M	18	Reduce	Intensive controls and training before site activity start, intensive supervision	M	M	10
R04.5	Threat	Mechanical Contractors not familiar with safety rules	VH	M	18	Reduce	Intensive controls, training before site start, intensive supervision, better process for selection of safe oriented contractors	M	M	10
R104.2	Threat	Ele Building not in conformity with FWI requirements	H	N	0	Transfer	Punch List Items to rectify non conformity	H	N	0
R105	Threat	Out of Sequence Phase of the work	VH	H	36	Reduce	intensive control and progress check	H	M	14
R106	Threat	Strikes	L	M	6	Accept		L	M	6
R115	Threat	Mechanical Contractor approach to subcontract all the work to many small subcontractor	VH	H	36	Reduce	new contract conditions that regulate better the subcontract process	M	M	10
R120	Threat	availability of local qualified supervisor for future Works	H	L	7	Reduce	preliminary investigation	M	L	5
R125.2	Threat	drawing approval process delay by Authorities on Ele/Ins activities	L	H	12	Reduce	anticipate discussion with Zues	VL	L	1
R128	Threat	Long Delivery on Lot 2 Equipments	L	M	6	Reduce	select better deivery	L	L	3
R130.2	Threat	resistance to local contractors to comply with standards that are different to common practice in Stade (changes and redoing in construction)	VH	H	36	Reduce	involvement client, KOM to close gaps	M	M	10
R132	Threat	High Turnover in workforces	VH	M	18	Accept		VH	M	18
R135	Threat	Damage of water proof membrance in Turbine Building Roof and water that falls on GTGs	VL	VH	8	Reduce	protect the roof	M	VH	40
R137	Threat	Availability of lifting equipments	VH	VH	72	Reduce	Detailed lifting plan, Booking in advance	M	H	20
R140	Threat	Control room available for installation of Cogen Equipments	M	VH	40	Reduce	by INFRA	M	VH	40
R145	Threat	PED certification delays of HRSG site works, carried out by GMC	L	H	12	Reduce	Engage NE Nobo, and qualified inspectors for site activities	N	H	0
R146	Threat	Blow Down Pumps not in accordance with requirements	M	M	10	Accept		M	M	10
R17	Threat	Infrastructure modification	H	H	28	Avoid	Integrated schedule, contractor selected and work planned for 1Q 2012	M	H	20
R21	Threat	Transportation damages or losses	M	VH	40	Reduce	use of qualified Transportation company, Monitor transportation	L	H	12
R22	Threat	Contractor manpower availability at peak	M	H	20	Reduce	check during contract evaluation	VL	H	4
R25.1	Threat	Snow and low temperature in winter	VH	H	36	Reduce	Tents or other equipment available in case of bad weather	M	M	10
R25.2	Threat	Wind (March-Apr & Nov)	VH	M	18	Reduce	Avoid Lifting in this period, work organization	VH	M	18
R30	Threat	Congested area	VH	VH	72	Reduce	Prefabrication plan, handling and supervision, just in time delivery	H	VH	56
R32	Threat	Notified body approval	VH	VH	72	Reduce	Special function to monitor the process, coordination meetings with TUV	M	VH	40

RISK ANALYSIS: RISK MATRIX

Opportunities impacts ascending

Threats impact ascending

Pre-Mitigation

Probability of occurrence

Very High	High	Medium	Low	Very Low	<-- Opportunities Threats-->	Very Low	Low	Medium	High	Very High
	(2) R24.1, R67	(1) R24.2			Very High		(2) R37, R02	(5) R25.2, R04, R25.1, R79, R59	(7) R82, R107, R40.2, R87, R12, R40.1, R05	(5) R32, R30, R86, R15.1, R14
			(1) R112		High		(1) R28.1	(4) R27, R28.2, R90, R39	(5) R17, R66, R84, R55.1, R60	(3) R36, R15.2, R11
					Medium		(3) R93, R19, R29	(6) R52, R58, R78, R23, R46, R69	(1) R55.2	(2) R65, R64
	(1) R24	(2) R03.2, R44			Low		(2) R03.3, R16.2	(2) R106, R50	(2) R22, R10	
					Very Low					(5) R21, R76, R49, R108, R41

high probability hig impact

RISK ANALYSIS: IMPLEMENTATION STEPS

•Before the run of the schedule It's necessary to check the schedule "health"…

•All the schedule "allowances" have been removed.

• All risks identified are associated to corresponding activities and then modeled into the CPM according to their own parameters (probability and magnitudo)

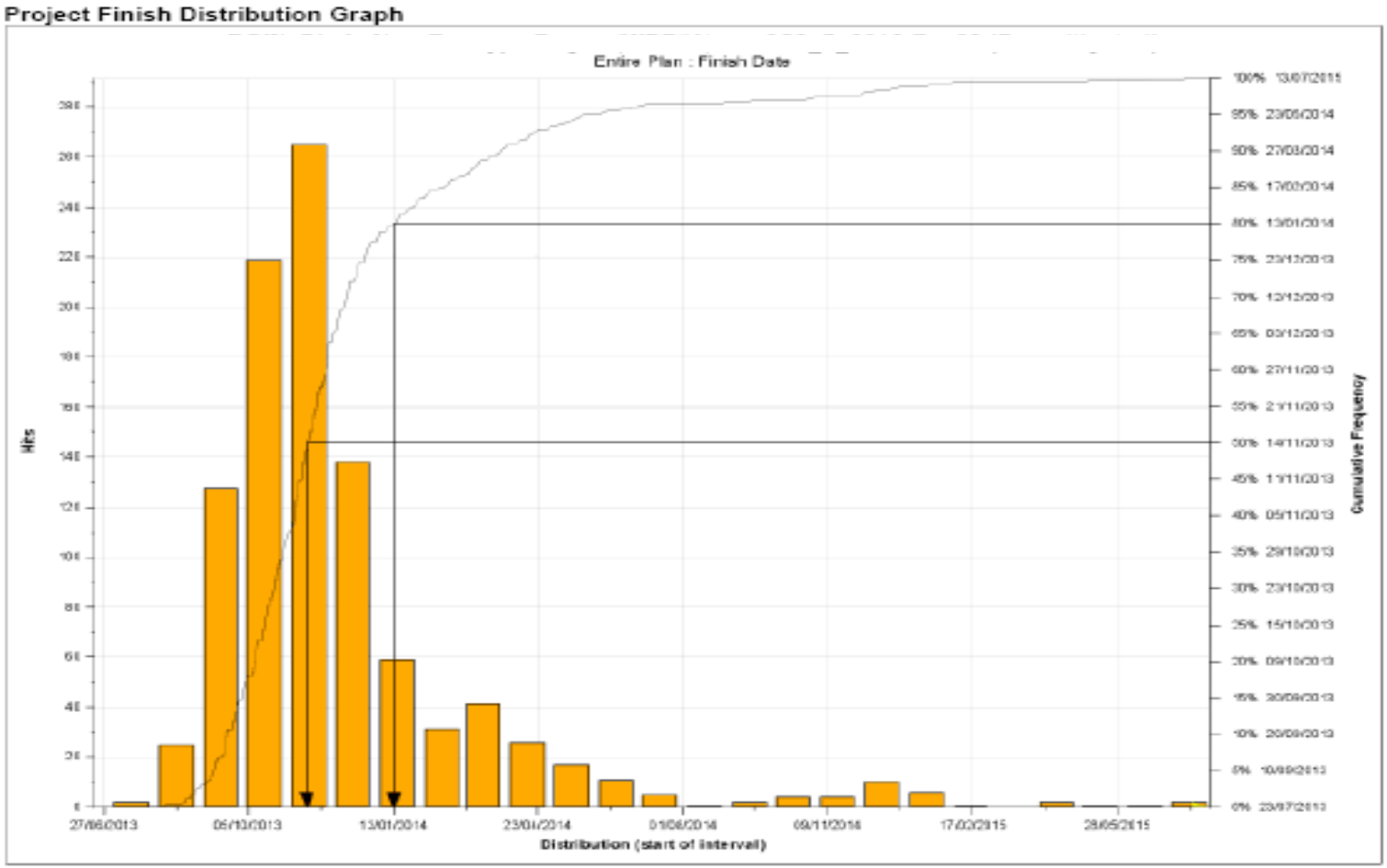
•Montecarlo analysis is then run to provide probabilistic curve of completion

RISK ANALYSIS: PRE-MITIGATED IMPACT PLAN

- Pre-mitigated results on project completion :
  - Deteministic value: mid June 13
  - P50 Pre-Mitigated Schedule completion mid Nov 13
  - P80 Pre- Mitigated Schedule completion mid Jan 14

RISK ANALYSIS: PRE-MITIGATED RESULT

The following probabilistic distribution on completion dates is obtained



RISK ANALYSIS: PRE-MITIGATED RESULT

The following represent the list of the most impacted activities, i.e. Those activities for which the implementation of a mitigation action could improve schedule result...

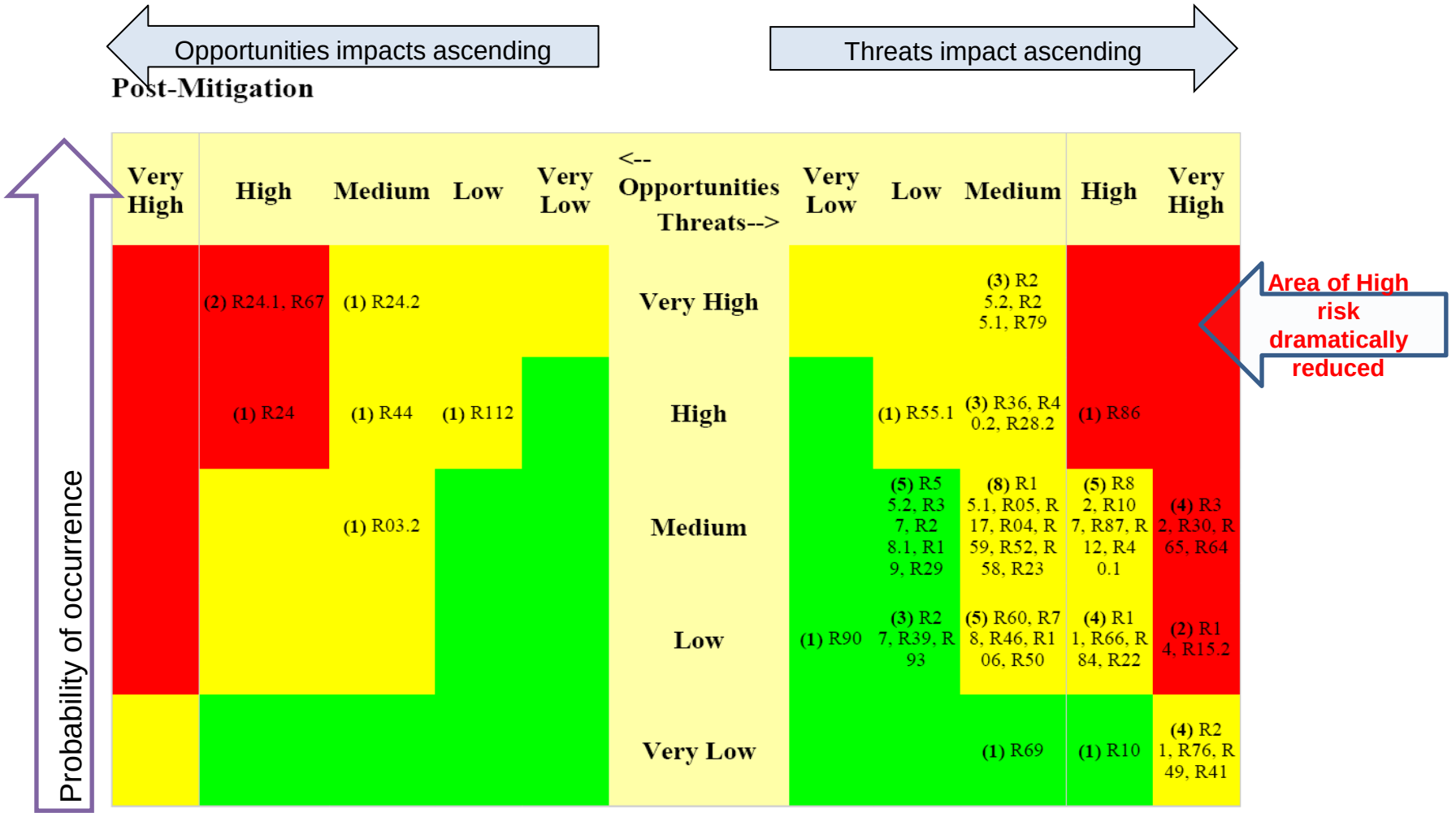
RISK ANALYSIS: MITIGATION ACTIONS

After the run with all risks, the Project Manager selected to pursue some of the mitigation action listed...

- Incentive plan for critical supplier
- Authority consultant involved for support on standards and permitting process
- Anticipation of piling & civil works
- Additional manpower in supervision
- modularization option
- Maximization of fabrication at shops
- Maximization of preassembling at site (steel works)

- The mitigations are introduced in the CPM and then the Post mitigated results are obtained

RISK ANALYSIS: POST-MITIGATED RISK MATRIX

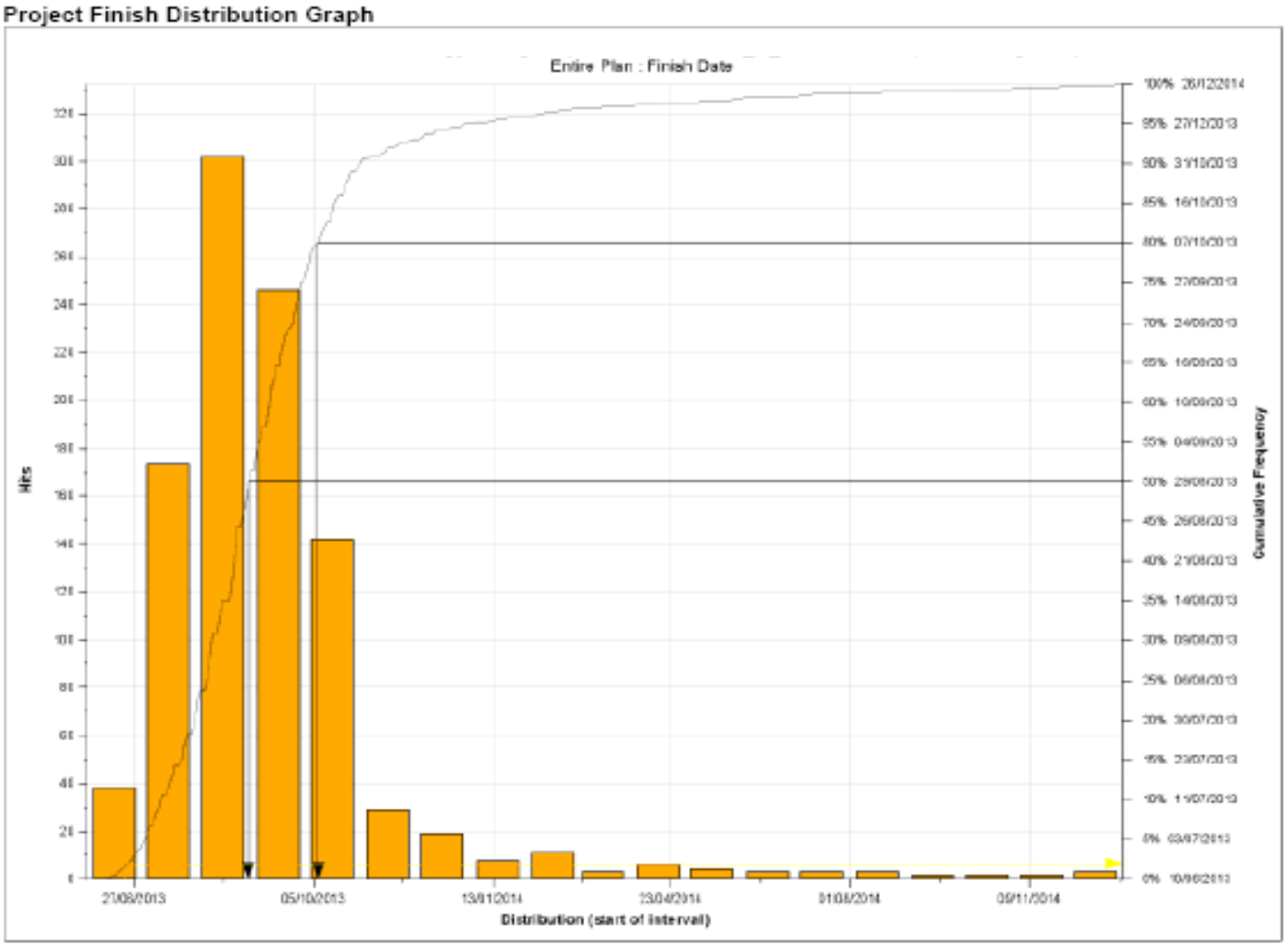


RISK ANALYSIS: POST-MITIGATED IMPACT PLAN

- Post-mitigated results on project completion :

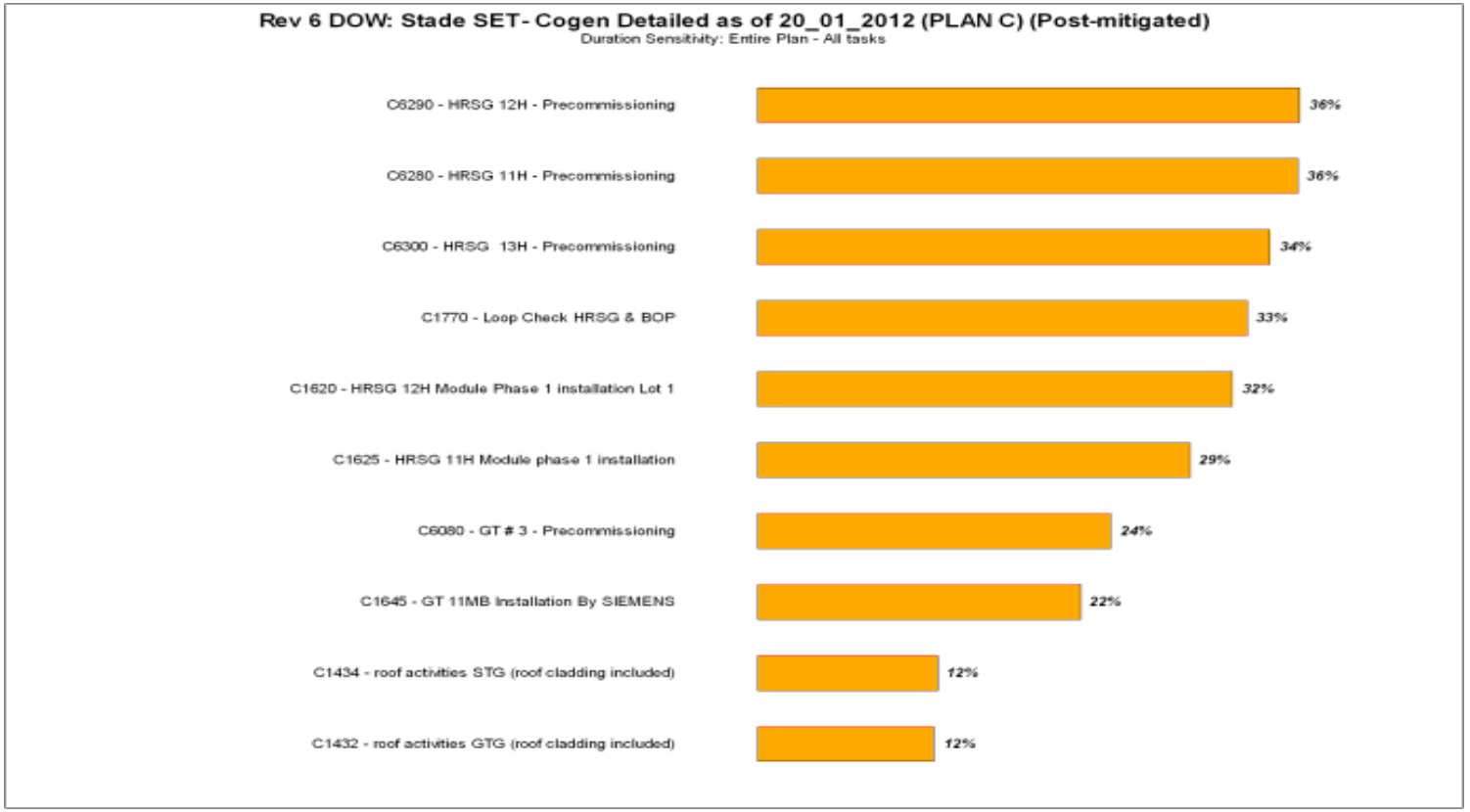
  - Deteministic value: mid June 13
  - P50 Post-Mitigated Schedule completion end Aug 13
  - P80 Post- Mitigated Schedule completion mid Oct 13

RISK ANALYSIS: POST-MITIGATED RESULT

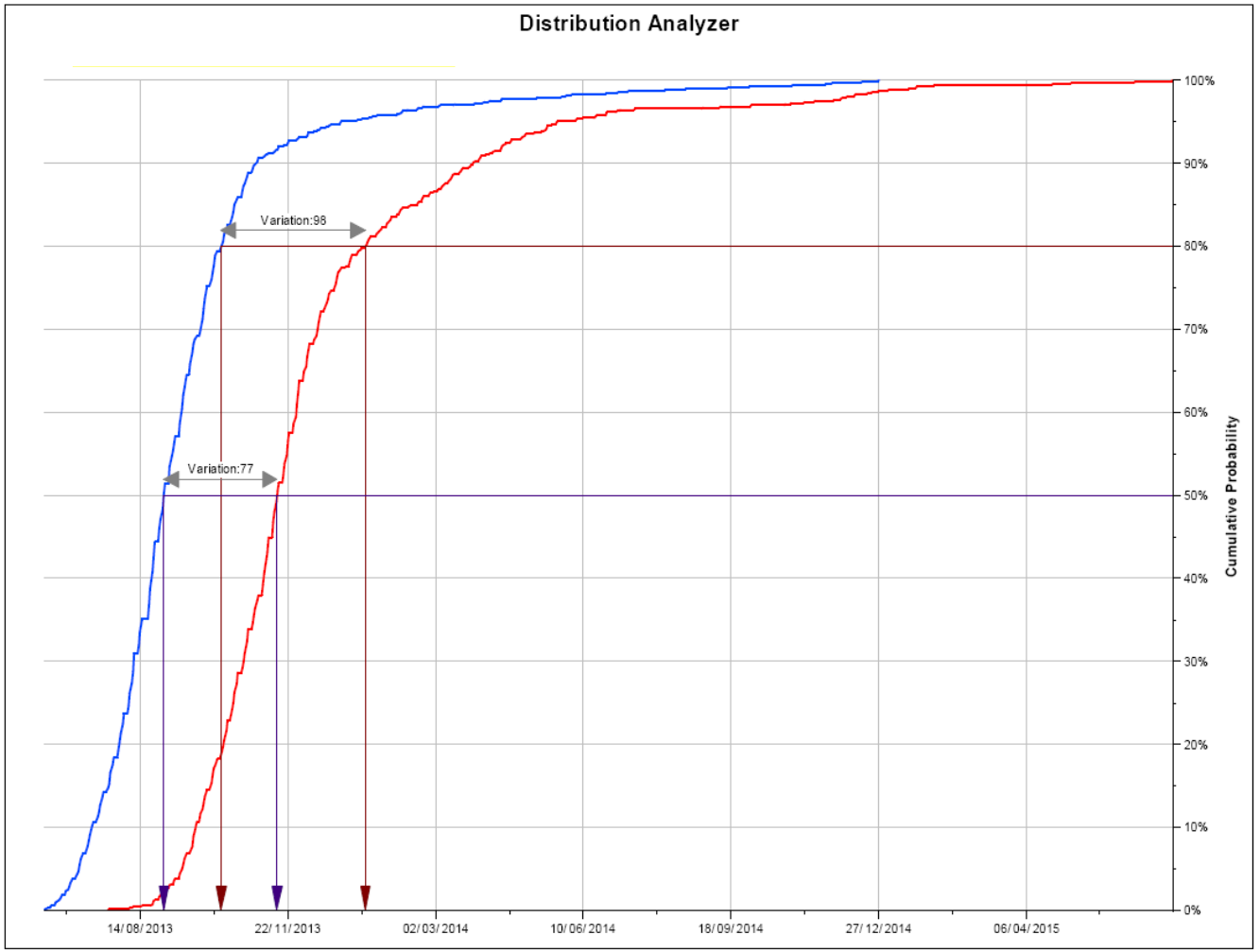


RISK ANALYSIS: POST-MITIGATED RESULT

Effect of the mitigation action on the list of activities impacted by the treaths... Reversal of ranking vs pre- mitigated schedule...



RISK ANALYSIS: DISTRIBUTION ANALYZER



Risk Analysis: Conclusion

By integrating directly project schedules to model risks and uncertainty, the Risk Analysis provides a full-lifecycle schedule risk analytics solution

Provide quick and easy techniques for determining schedule project confidence levels

Provide a useful representation of most critical activities and related risk helping Project management to drive action in effective way..

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