

CHEM-E0115 Planning and Execution of a Biorefinery Investment Project (5 cr)

Lecture 3: Investment Implementation Phase – Project Controls: Risk, Contract, Change and Claim Management Jarmo Jäppinen



Introduction

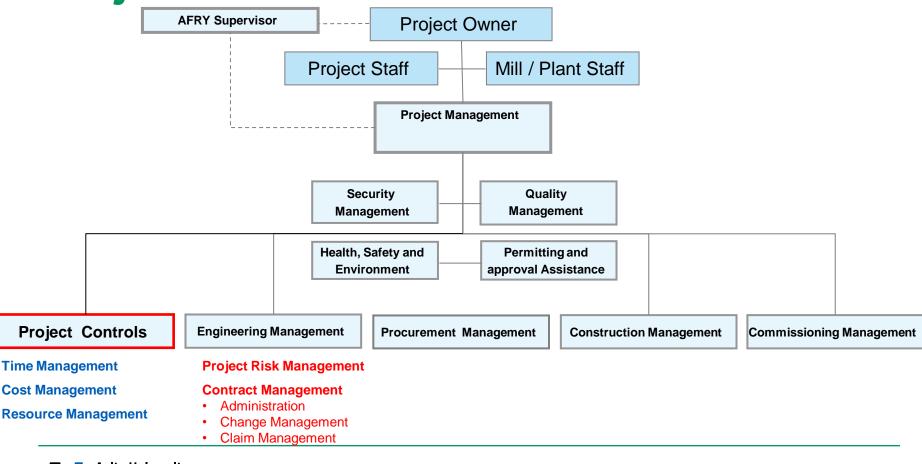
- **1. Project Functions**
- 2. Risk Management
- 3. Contract Management:
- Administration,
- Change Management and
- Claim Management



1. Project Functions



Project Functions





30.9.2021



What "risk" means?

"A situation involving exposure to danger"

There is a difference between the "risk" and "cause"





Risk analysis

- There are formal methods used to "measure" risk
- Often the probability of a negative event is estimated by using the frequency of past similar events
- Risk is often measured as the expected value of an undesirable outcome. This combines the probabilities
 of various possible events and some assessment of the corresponding harm into a single value.

 $R = (probability of accident occurring) \times (expected loss in case of accident)$

 $R = \sum_{\text{for all accidents}} [(\text{probability of accident occurring}) \times (\text{expected loss in case of accident})]$



Work Processes	Tasks	Deliverables
	Risk register development	• Risk review report (first) - Risk review basis - Risk register and action plan
Project Risk Management		- Risk map
	Risk register monitoring	• Risk review report (continuation) - Risk register and action plan - Risk evolution charts



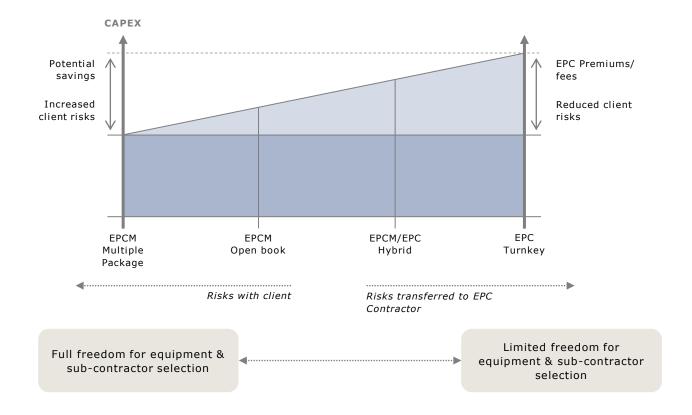
- Preparing for unexpected events during the project
 - Facilitates decision making in different project phases
 - Awareness of threats to project objectives
 - Inform management, transparency
 - Protects budget, schedule, and quality (safety and environment)
 - Understand challenges and their dimensions in a similar/realistic way consensus

• Qualitative and quantitative methods

- Ranking high, med, low qualitative
- % and €, statistical analysis quantitative



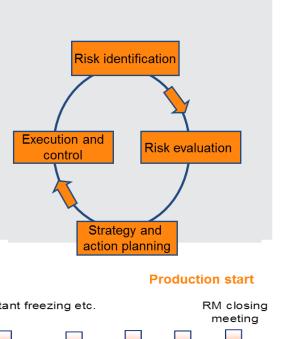
Who Carries the Risk (ref. also Lecture 2)





Risk Management Process

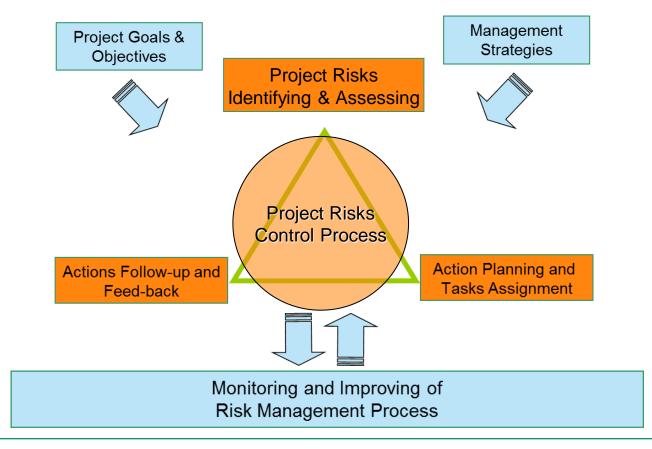
- Definition of the risk management scope
- Identifying risks with assistance of a knowledge browser
- Evaluating the risks, defining probability (%) and impact $\ ({\ensuremath{\in}})$
- Defining **strategy** (tolerance level for risks)
- Action planning (defining eliminating and mitigating actions, evaluating the effect of actions on the risks)
- **Execution and Control** (reporting, monitoring and feedback, trend analysis)



Implementation startProduction start'Pre-project' risk
management to assist
in decision makingRM review meetings before important freezing etc.
points of the projectRM closing
meetingImplementation startProduction startImplementation startRM review meetings before important freezing etc.
points of the projectRM closing
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Risk register development and monitoring





Kno	wledge Browser for	Definitio	n, analysis and	St	rategy	and	action	
r	isk identification	е	valuation		pla	Inning		
	CHARTS PROJECT RISK CO-PILOT CHARTS REPORTS SETUP Demon 1 - Demonstration Project Value: 500 000 000 EUR R	evision: 23.4.2010 💙	New Revision		Return to Nav	igation 9	User Adminis	stration
Check Lis	t - Implementation Browser (6)	X Delete	* Required field	Actions History	Comments			
	NNING AND SCHEDULING (1) QUALITY OF SCHEDULES	ID:	24	Y Estimated impact X Probability) Toleran	ce 1 000 000	
1.2	An overall schedule exists Start-up sequerce is logical	Check List Item:	5.13 Experience of suppliers / contractors per	1000 -				
1.4	Relationships between different functions exist in the	Cause: *	Contracting strategy					
1.5 1.6 1.7 1.8 1.9	schedule and they are correct Schedule is exceptionally tight (1) Schedules are soordinated between different functions (eng, proc, del, const erec.) Schedule is vague and changing Schedules are fased on agreed WBS Implementation plan exists	Description: *	A local supplier for the power distribution package has been selected on a lowest price basis. Gualty problems were experienced on previous projects. Quality problems may cause charge to commissioning.	100 - 10 - 1 - 0,1 - 0,00%	1.33%	-		
1.10	Construction methods are known SCHEDULE MANAGEMENT	Probability: *	25%	0.01 - •				
1.12	Commitment of all stakeholders to the schedule	Impact: *	Triple Estimate	0.001 2	25	50	75	
1.13	Project begins on time Essential decisions are made on time		O Single Value		2.0	50		
1.15	Constant slipping of schedule		Min: Most Prob: Max:	X Delete Action				
1.16	FOLLOW-UP OF SCHEDULE		2100000 6300000 12600000	State: *	Started			~
1.17	Follow up is sufficient for early detection of schedule deviations		Estimated impact: 6 650 000 (1.33 %)	Description: *	Interaction and	diling plan in h	e prepared and	
1.18	Follow-up is made with measurable units (planned and	Expected Cost:	1 662 500 (0.33 %)			monitor progr	ess of electrical	
1.19	earned progress) Recovery plans are used	Area:	Power Distribution (BOP)		particular and a second s	nutacture		
	RMITTING AND AUTHORITIES (1)	Definition of Impact:	min = 1 week delay	Responsibility: *	John Spark			
2.1	PERMITTING PLAN A specific plan for permitting exists		most prob = 3 week delay max = 6 week delay	Identified By: *	Mr Smith			
2.3	Legislation of the target country is well known by those		lost production from delay to start up =	Cost:	50000			
2.4	Involved in permitting AUTHORITIES		300,000 per day	Due Date:	13.6.2010			
2.5	The role of authorities is clear	Reason for Change in Impact or		New Probability:	10			
2.6	Authority practice vague or unknown	Probability: *						
2.7	Customs clearance procedures and durations known (1)		34	New Impact:				
	Restrictions or charges associated with imported equipment							



Risk Management - Co-Pilot™ - application



Show All O Top 5 O Top 10 O By Mayor Group I. PLANNING AND SCHEDULING

D	Risk Cause	Risk Description	Probability	† Expected Cost	Impact	Area	Actions	Comments
	Quantity of workforce > 7,000	Due to previous experience, and the large numbers of workers on site, especially during erection work, there will most likely be labour strikes to resolve	80	2 160 000	2 700 000	Common	0	0
	Contracting strategy	A local supplier for the power distribution package has been selected on a lowest price basis. Quality problems were experienced on previous projects. Quality problems may cause delays to commissioning.	25	1 662 500	6 650 000	Power Distribution (BOP)	1	2
	Many projects ongoing in the same region	There is a risk that the quantity and quality of workforce is not available for the full duration of the project. On site training will be required to improve construction / erection productivity.	45	900 000	2 000 000	Common	0	0
	Client defined start up date	The time objectives of the project are extremely demanding. Minor delays will be difficult to recover and have the potential to delay the project.	25	160 000	640 000	Project Wide	0	0



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Risk Management- Co-Pilot™ - application

Risk evolution over time



Show All O Top 5 O Top 10 O By Mayor Group 1. PLANNING AND SCHEDULING ID **Risk Cause Risk Description** Area Actions Comments Quantity of workforce > Due to previous experience, and the large numbers of workers on site, especially during 70 6 1890 000 2700 000 Common 0 7,000 erection work, there will most likely be labour strikes to resolve A local supplier for the power distribution package has been selected on a lowest price basis. Power Contracting strategy Quality problems were experienced on previous projects. Quality problems may cause delays 25 1 050 000 4 200 000 Distribution 2 4 to commissioning (BOP) Many projects ongoing in the There is a risk that the quantity and quality of workforce is not available for the full duration of 45 900 000 2 000 000 Common 0 0 same region the project. On site training will be required to improve construction / erection productivity. Effluent treatment supplier is providing a new technology solution that has not been Effluent New technology 15 675 000 4 500 000 0 8 0 melemented on this analy hoters for minning may take tangar than superiod ----



Co-Pilot™ - application - Qualitative Analysis

Project: 1974 - Qualitative Demonstration Project Value: 100,000,000 AUD Revision: 31/05/2011 V New Revision | Edit Project

	Constant slipping of schedule	^	🗡 Delete	* Requir	ed field	Actions His	tory C	omments				
1.16	FOLLOW-UP OF SCHEDULE					Y Impact						
1.17	Follow up is sufficient for early detection of schedule		ID:	1		X Probability						
1.18	deviations Follow-up is made with measurable units (planned and		Check List Item:	2.10 Sufficient knowledge of permitting requi	re 🗸	4					17	
4 40	earned progress) Recovery plans are used		Cause: *	New site location with unknown permitting re	quirer	Very likely						
	RMITTING AND AUTHORITIES		Description: *		1000	3						
2 PE 2.1	PERMITTING PLAN		Description.	A new site location has been selected and the local permitting requirements are	_	Likely						
2.2	A specific plan for permitting exists			unknown. There is risk that delays to		2 Possible			1			
	Legislation of the target country is well known by those			commencement of the project will occur if		1					Constant of the	
2.3	involved in permitting			authorities require additional documentation.		Unlikely						
2.4	AUTHORITIES						1	2	3	4	5	6
2.5	The role of authorities is clear				~		Minor	Intermed	Signif	Major	Catastr	Major
2.6	Authority practice vague or unknown		Probability: *	2 Possible	~							Catastr
2.7	Customs clearance procedures and durations known		-	2 POSSIDIE	×	Add New A	ction					
2.8	Restrictions or charges associated with imported		Impact: *	3 Significant	~	No Actions						
2.9	equipment and material PERMITTING REQUIREMENTS		Area:									
2.10			Definition of Impact:									
	Adequate resources for preparing permit applications exist											
2.12	Permits are sufficient for transported equipment (e.g				-							
	steam- and pressure systems)											
	Permit requirements may change		Reason for Change in Impact or		~							
3 EN 3.1	GINEERING ENGINEERING SCOPE		Probability:									
3.2	Engineering definition clear (Engineering company /				~							
2.2	Supplier)											
3.3	All areas/disciplines are covered			Update Close								
3.4	Scope at interfaces is accurate											
3.5	ENGINEERING SCHEDULE											
3.6	Engineering schedule is realistic and based on coordinating construction and erection schedule											
3.7	Decisions, interfaces and other milestones are clearly defined											
3.8	Activities are clearly defined within areas, disciplines, objects and responsibilities											





ELDORADO PULP MILL – BRAZIL 2013

separate slides



Benefits of Risk Management

- systematic process
- increased transparency
- awareness
- cost savings
- reduced disputes
- working method improvement
- documented risk reporting



Increasing the probability of the project achieving its objectives.



Successful Investment Project (ref. Lecture 2)

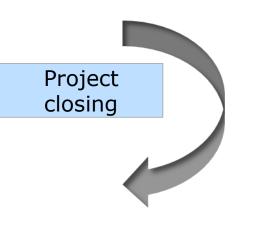
Development

Implementation

Production

Criteria

- The plant is completed within schedule
- The plant is completed within budget
- Production starts / develops as planned regarding product quality and quantity
- Product sales begins according to the market preconditions
- Operation & maintenance runs reliably





Conclusion (ref. Lecture 2)

Succesful project implementation is all about Management of Risk



Lesson Learned

- Risk: sailing boat's speed becomes slower due to growth of "seafood" on the bottom part of the boat;
- Cause: missing anti-fouling paint
- Mitigation: use of anti-fouling paint
 - Anti-fouling paint was used, BUT the type of the paint used was wrong (not suitable for big oceans)
- Lesson Learned:

PAY SPECIAL ATTENTION TO THE RISK MITIGATION ACTIONS and FOLLOW THAT THESE ARE EXCECUTED ON TIME

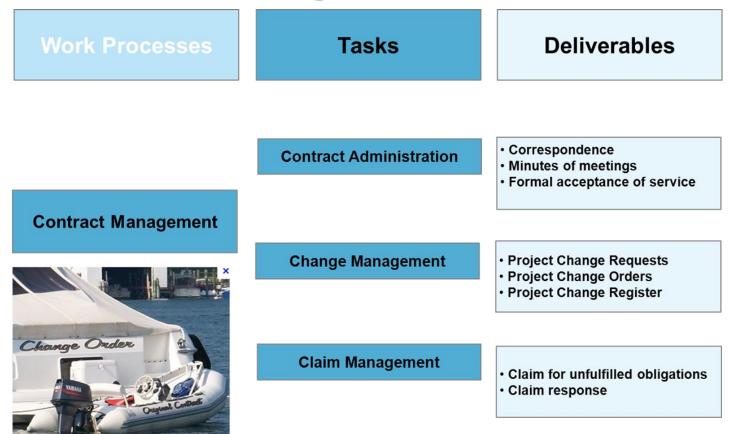




3. Contract Management



Contract Management





Contract Management Objectives

- Ensure that the rights, obligations, responsibilities and liabilities of the parties are clearly defined
- Ensure that contracts are fulfilled at the right time and in a right way
- Increase client satisfaction
- Decrease the meaning of gap-filling laws and regulations and improves foreseeability
- Decrease the risk of financial loss
- Improve the contracting process
- Help manage and mitigate the liability risk



Contract Administration

- Proposal phase
 - Define scope clearly
 - Timing of events
 - Define change management process
- Initiation phase
 - Communicate contract to team
 - Prepare contract management plan
- Execution phase
 - Maintain continuous, consistent, and complete documentation
 - Confirmation in writing
 - Proactive change management
- Closing phase
 - Document contractual completion, formal acceptance
 - Settle all claims, complete final payments

- General Terms and Conditions
- Background checks
- Tax issues



Change Management

Continuously identify, assess, and implement changes to the contractual scope of work, cost, or schedule.

Raised by any contractual party - caused by any project participant.

- Project Change Requests
- Project Change Orders
- Project Change Log



Change Management Tasks

- Identify Change
 - Separate meetings / progress meetings
 - Daily work
- Prepare and submit Project Change Request
 - Standard template, analyse impact and define change
 - Agree internally to submit
 - Present to client
- Convert Project Change Request to Project Change Order
 - Forms part of contact documentation
 - Integrate into project execution, inform team
- Monitor status of all PCR's and PCO's using change log
 - Standard template
 - · Highlights when to take further action
- Agree Change/Claim strategy
 - Negotiate further
 - Commence claim management
 - Accept that change is rejected

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oject Change Order Roge	nist for C -	E and MC projects					3
	Proje	t Change R	Reque	st (PCR) / 0	- E Pro	piects	
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Contract Number	1000000						
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			_		_		
Description / Reaso	a for the	Change	_				
Caused by:							
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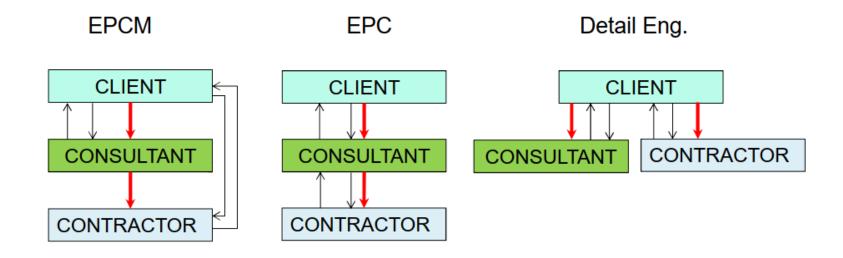
Change Management

Maintain detailed records for change orders

- Time sheets (man hours) signed by client
- Material purchases
- Equipment & Small Tool usage
- Administrative cost
- Engineering re-design
- Schedule effect
- Manpower increase requirements







= management responsibility = contractual responsibility

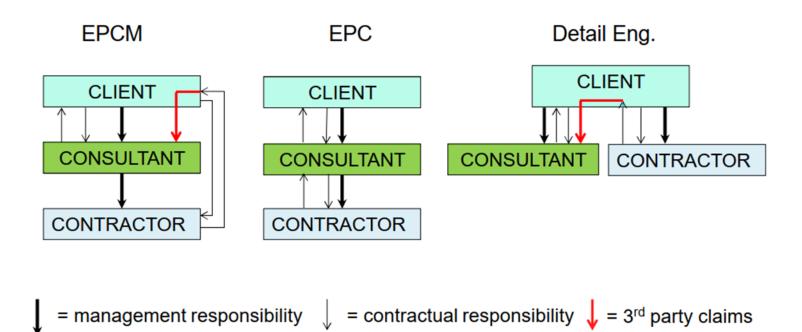


- Tendency to claim has increased threshold to claim lowered
- Claims management becoming more professional
- Typical reasons for claims
 - tight, overrun budgets
 - poorly defined scope of work
 - disagreement on changes and additional work
 - unsuccessful project
 - "take it from the insurance"
- · Claim and dispute management is
 - expensive
 - takes management time from business
 - unpredictable for outcome \rightarrow you seldom win!
 - a delay of payments
 - a risk in client relationship





Common consultant scenarios





Sources of failure in project that can lead to claims

- Inadequate planning
- Acceptance of unrealistic time schedules
- Inadequate project follow-up
- Insufficient utilisation of existing resources
- Project staff participate in too many projects simultaneously
- Insufficient definition of project targets
- Poor communication
- Undue optimism in relation to cost and time requirements
- Unclear responsibilities
- No risk management
- Expansion of project scope during the execution



Typical alleged errors/negligence causing claims against consulting engineer

- Wrong measurements
- Calculation errors
- Structural errors (wrong concept)
- Piping errors
- Omission of a circumstance, fact or surrounding factor
- Negligence in relation to soil investigation studies and geotechnical design
- Misunderstanding on the deliverables or the schedule
- Negligence in supervision or construction management duties
- Pass-through of third party claims



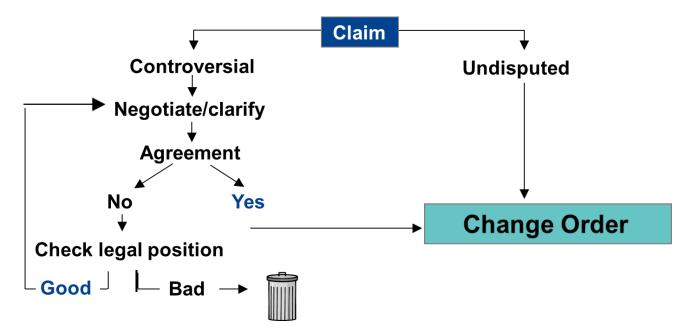


Settlement of disputes

- Different ways of settlement
 - Negotiation
 - Arbitration
 - Final, normally appeal not possible
 - · Normally faster but more expensive than litigation
 - Litigation
 - Public
 - · May be slow, subject to appeal to higher courts
- Always try to negotiate
 - Usually cheapest
 - Least time consuming
 - You know the outcome



Dealing with a Claim:





When you face a problem, <u>DO</u>:

- <u>Remain calm</u>
- Report immediately to your Client and in-house lawyer
- Ensure that your broker/insurer is informed immediately
- Focus on problem solving
- Only communicate orally:

"we'll look into it and get back to you shortly"

- Document, photograph, photocopy and collect evidence
- Document carefully all Purchaser delays even delays in responding
- Consult your lawyer for all correspondence
- Negotiate and mediate but prepare to litigate!



KEEP GOOD DOCUMENTATION

- Continuous, consistent and <u>complete documentation</u>
 - \rightarrow too much is not enough!
- Minutes of meetings, records of decisions, notes of phone and conference calls, email and fax correspondence etc.
- Official and unofficial approvals and statements throughout project
- Always confirm in writing what has been agreed orally!



- Claim Management is easier when:
 - accurate scope and services description are in the contract
 - clear contract terms and conditions are agreed
 - good relationships with the customer have been established
 - PM had a chance to review the contract terms before signing off
 - sound procedures are in the contract to address claims
 - a good project documentation is available
 - CM is started early in the project execution

- Claim Management is more difficult when:
 - all this (left side) is not achieved!
 - previous lessons are not learnt
 - certain pressure on contractual parties (e.g. lack of cash to pay) are not known
 - client is not satisfied with our services
 - lack of continuity in the project team including change of PM (not in all case)!



Questions from students







Jarmo Jäppinen Senior Contract Manager, Industry Business Group AFRY Finland Oy jarmo.jappinen@afry.com www.afry.com