

### AEB Round Table: AEB Machine Building & Engineering Committee



EPCM and EPC approach for investment projects. In Russia...

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Andrey Sosnovsky,

Director, Tebodin Eastern Europe B.V.





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  Permitting



### References

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- see Life Science Leader, January 2010, written by Craig Crowther, or
- Delivery Vehicle Project Contracting Strategy Whitepaper written by Mercor Consulting Pty Ltd.
- Main type of contracts
- see Levy, Sidney M. Project management in construction / Sidney M. Levy.— 4th ed., or
- Commercial packaging Project Contracting Strategy Whitepaper written by Mercor Consulting Pty Ltd.
- And much more...



# **Definitions: Project Delivery Methods**

- Supply of Equipment (Only)
- Engineering and Consulting (Only)
- Construction Contract (Only)
- Engineering Procurement Construction: EPC
- Engineering Procurement-Construction Management: EPCM
- Project Management Contract: PMC
- Program Management

Worth to mention:

- Design-and-Build
- Design-Bid-Build



# **Definitions: Main Type of Contracts**

- Reimbursable or unit price contract
- Cost plus Fixed Fee
- Cost plus Fixed Fee with Guaranteed Maximum Price GMP
- Fixed Cost or
- Turn Key Lump Sum contract



# **Definitions: Main Type of Contracts**

Delivery Method	Concept (IRD) FEED	Tender I	«P» "BD"	Tender «P+» "BD+"	II	Detail Design	As B	uild	Com	missioning	
EPC Turn key		N/A		N/A							
EPC or	FEED contra		N/A								
Design-and-		EPC or	<sup>.</sup> Design-ar	nd-E	Build Contra	ctor					
Build											
EPCM and	Design-Bid-Build Contractor										
Design-Bid- Build	EPCM contra	actor: Desig	ler E	CM contractor: CM							
EPCM (full scope)	EPCM contractor: Design + tender					EPCM contractor: CM					
GC								Genera Contra	al ( .ctor	Construction)	



### **Project Delivery methods: EPC and EPCM**

- EPC (Engineering, Procurement and Construction): means the company is contracted to provide engineering, procurement and construction services by the owner. Think Design & Construct style contracts, where the project is largely Contractor managed and the cost risk and control are weighted towards the Contractor and away from the Owner. The EPC contractor has direct contracts with the construction subcontractors.
- **EPCM (Engineering, Procurement and Construction Management):** means the company is contracted to provide engineering, procurement and construction management services. Other companies are contracted by the Owner directly to provide construction services and they are usually managed by the EPCM contractor on the Owner's behalf. Think *Professional Services* contracts, where the project is largely Owner managed and the cost risk and control is weighted towards the Owner.



### **Typical EPC scheme**





### **Typical EPCM scheme**





## Comparison

### **EPCM Advantages:**

- Lower Overall Cost
- Staff's Sense of Ownership
- More Control over Process
- Better for less defined projects with anticipated changes to scope of supply
- Less Legal Litigation (Identify issues early and remedy situation before larger problems arise)
- Owner's Financing Flexibility

#### EPC Advantages:

- One Stop Shopping "One point of Contact"
- "Hands off" approach to project
- Minimal Staffing Requirements
- Minimal Legal Risk
- Best for well defined projects with Detailed Engineering Complete before EPC Contractor selected (Minimal Unknowns).



## **Typical EPCM project scheme**







### **Typical EPCM project**



#### Excavators production plant, Tver region, 2011– ongoing

Capacity– 2 000 excavators/year Site area – 400 000 sq.m Building area – about 32 000 sq.m.

#### Tebodin scope:

- Engineering surveys
- Design (including detail engineering)
- Procurement
- Permitting
- Construction management



## **Typical EPCM project**



# Tires manufacturing plant, Lipetsk region, 2009 – 2012

Capacity - 1,4 Mio tires/year



#### Tebodin scope:

- Project management
- Cost estimate
- Conceptual, Basic and Detail design
- Procurement
- Permitting
- Construction management
- Supervision over process equipment installation



### **Typical EPCM project**



Basic design, tender package, adaptation of detail design, construction management for construction of a new cement production dry line with capacity of 5,000 t/day, Kaluga region, 2010 - ongoing



### **International Airport 'Lviv'**



Conceptual design, basic design and detail design, logistics consultancy (2009).

Author supervision (2010 - 2012).

#### **TEBODIN** always Consultants & Engineers close Matrix of main services through EPCM Project Cycle (I)

#### **Project Cycle Phases** Tebodin Function **Concept Design Due Diligence Basic Design Tender/Detail Drawings** Construction Visual site assessment Assessment and Independent expertise of 3-rd Independent expertise of 3-rd party's Analysis of executed works Consultant Utility consumption / adaptation of party's BD **Detail Design** Analysis of budget Lender Monitoring (Inception) connection assessment Client's concept Lender monitoring (Inception phase) consumption Study of site / design Budget estimate Analysis of Clients budget est. Analysis of project documentation Analysis of site, permitting and Study of utility progress upon spent ESA phase I & II connections and design documentation budget Asbestos survey Study of contractors docs. Estimation to complete associated costs **Preliminary EIA** Preparation of bankable report Construction supervision for loan obtaining DD report preparation Construction management Lender Monitoring (monthly reports) Option I: Tender drawings: MP, Development of Development of Basic Design: Implementation of design Engineering changes upon Client's Conceptual Design: MP, A&S, M&E solutions, excavations and foundation, A&S, MEI (MP, A&S, M&E demand (based on Utility connection solutions parts, for all buildings and external solutions) Special reports: Fire safety, utilities additional agreement) Budget estimate EIA, Labor safety, Energy Option II: Detail drawings: MP, Study of utility saving, Construction excavations, foundations, architectural and external utilities. Tender drawings: connections and organization associated costs structural and MEI Option III: Adaptation of 3-rd party's drawings Implementation of design changes upon Client's demand (based on additional agreement) Planning and control of Planning and control Lead on design input data collection See below Construction Project of CD scope DD scope execution Advise on permitting strategy Manager's scope Management execution Planning, time/progress management Interface control/management Lead permitting process Obtain building permit

Bi-weekly or monthly reporting



Tebodin	Project Cycle Phases										
Function	Due Diligence Concept Design		Basic Design	Tender/Detail Drawings	Construction						
Author Supervision					Is never part of the engineering scope and fee! Execution of Author supervision (min scope – one visit per week by two engineers) Author supervision log maintenance Bi-weekly or monthly reporting						
Construction Supervision					Is never part of author supervision scope and fee! Permanent presence on site for: Quality and quantity control, HSE control Inteface control						
Construction Management				Participation in Bids evaluation session and selection of General contractor	Lead construction process on site Planning, time/progress management Interface control/management Budget control						
Procurement			Tender of General desi contractors Forming of bidder's list Tender packages prepa Answering questions Technical and financial	gner and specialized design aration and distribution evaluations of bids	Tender of General contractor and nominated subcontractors/suppliers Forming of bidder's list Tender packages preparation and distribution Answering questions Technical and financial evaluation of bids Bids evaluation report						

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### **Project phasing** (medium / industrial)





### **Project phasing** (Buildings)





# Front End Loading/Project phasing



Client's organisation

Timely involvement of contractors/vendors/suppliers



# **Opportunity to influence costs**





# **Project phasing / influencing value**



Value



# Project phases Cost Estimate Accuracy

Conceptual Engineering	Basic Engineering	Detailed Eng + Procurement	Construction	Start Up, Guarantee
+/-25-40%		   		
	+/-10%			
		+/-5%	+/-3%	+/- <u>3 -</u> 0%



# Project Phases Flowchart





# **EPCM Project Schedule**

	20	)12	2012-2013												
	Nov	Dec	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Au g	Sep	Oct	Nov	Dec	Jan
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Conceptual Design															
Basic Design															
State Expertise															
Detail Design					1					,					
Tender for Earth Work															
Tender for General Contractor															
Earth Works															
Main Construction									1	1		1	1		
Equipment installation															
Commissioning															



### Construction Permit. Permitting hierarchy. Authorities. Timing





### Operation Permit. Permitting hierarchy. Authorities. Timing



### **Selection of Tebodin clients in Russia**



always

close

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### Thank you for your attention!



Find out what we can do for you:

Andrey Sosnovsky,

Director, Tebodin Eastern Europe B.V.

Moscow, 115114

10/4 Letnikovskaya Street

<u>+7 495 258 80 58</u> <u>moscow@tebodin.ru</u>