
CONQUERING
THE SUMMIT
ASPIRING TO FLAWLESS PROJECT DELIVERY
45TH
ECC CONFERENCE
2013
engineering and construction contracting association

Project Engineering – Safety Moment

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…from this high!

Project Engineering – Why? Where? How Much?

- Scott Brandenburg – BASF – Owner
- Bob Reymond – Burns &McDonnell – Engineer
- Willie Lefever – Performance Contractors – Constructor
- Matt Wilson – Mitsubishi Polysilicon - Moderator

OWNER

Scott Brandenburg

Vice President Engineering and Maintenance

BASF Corporation

Scott's Background

- 25+ years experience
- Engineering and Maintenance
- US and Europe
- Executed projects with 8 different Engineering companies
- Contracts: LSTK, EPC, EP, E, Reimbursable
- 4 Joint Ventures
- Types: Environmental driven, Emergency rebuild, New Technologies, Turnarounds, Grassroots Ethylene Complex

What contributes to an "Unsuccessful Project"? And how I lived through it.

- Too much turnover on Project Team (Owner, Engineer, Constructor). Loss of knowledge setbacks occur.
- Too much cut and paste engineering delays attention to design issues until HAZOP unearths them
- Size of job- if not staffed properly causes delays and quality issues especially if Contractor over-focuses on cost
- Late deliverables by Owner or Engineer impact Construction contractor, causes misalignment
- Large project=large risk, without good Project Engineering can lead to short sighted decision making

Unsuccessful Projects (continued)

- Lack of understanding between Contractor and Owner regarding HAZOP and Pre-startup Safety review by EPC contract
- Contractor uses “blackbox” approach for package units
- Contract revisions and incentives not used early enough to address potential delays and responsibilities late in the project
- Operations/Maintenance input ignored
- Turnover packages/responsibilities between Construction and Commissioning and Operations is not well defined.

ENGINEER

Bob Reymond

Vice President, Projects

Burns & McDonnell

ENGINEER

Bob Reymond

Vice President, Projects

Burns & McDonnell

Bob's Background

- 25+ Years Experience
- 17 Yr Engineering Firms / 3 Yr Owner
- Mostly EPC / Some engineering only
- International and Domestic
- Power, Nuclear, Petrochemical, Foods
- Most projects $100MM - $500MM
- Largest project $2 Billion

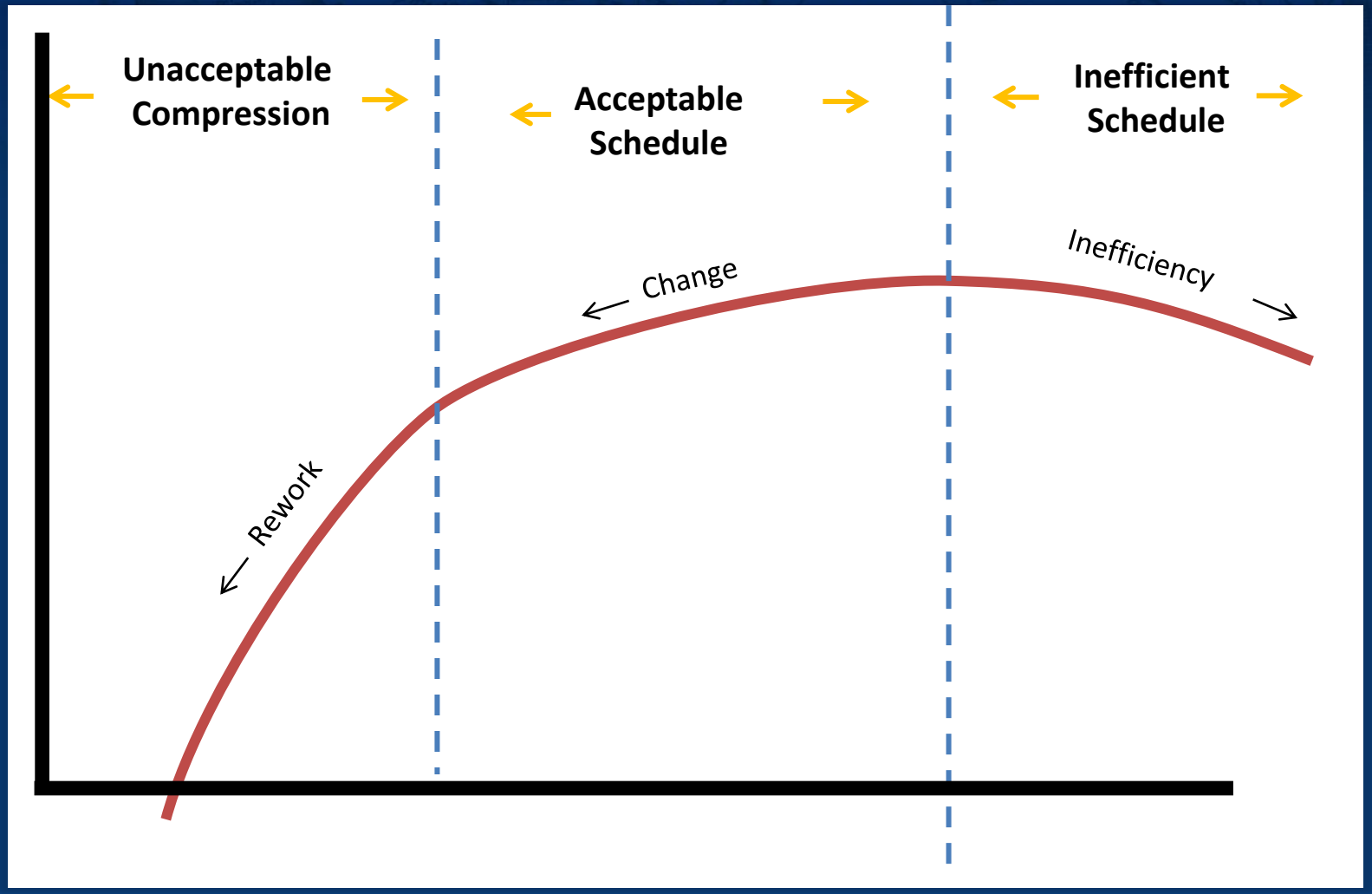
Engineering a "Successful Project"

- Owner project objectives well defined
- Alignment of goals
- Good scope definition; discipline
- Safety & Constructability considered early
- Disciplined planning process
- Realistic schedule expectations
- Design effort correlates to project size & complexity

Engineering into Crisis

- Significant external change
- Vendor information
- Engineer staffing
- Project Schedule

Engineering Quality vs. Schedule



CONSTRUCTOR

Willie Lefever

Vice President

Performance Contractors, Inc.

Willie's Background

- 35 years experience
- Primarily US construction, (1) international
- 10+ EPC or EPCM projects
- Contracts: LSTK, CPFF
- Power, Refining, Petrochemical, Upstream
- Types: Grassroots, Expansion, Environmental, Retrofit
- Technology led- vendor/contractor partnering

Willie's Project Example(s)

"Successful Project"

- Lump Sum EPC - $50+MM
- Proven process technology (reference plant basis)
- Clear project objectives
- Contract strategy alignment
- Defined Project Risk- all parties
- Clear roles and responsibilities (all contracting parties)

Willie's Project Example(s)

"Not So Good" Project

- Lump Sum EPC - $50+MM
- Technology and Schedule driven project
- Inexperienced technology provider in EPC project lead role
- EPC Contractor prime : construction subcontractor relationship
- Incomplete scope definition
- Segregated EP and C schedule

Willie's Project Example(s)

"Successful Project"

- Cost savings
- Ahead of schedule
- Client achieved business objectives

"Not So Good" Project

- Front end engineering & procurement delays
- Scope creep/quantity growth
- Construction schedule compression/excess costs

Questions?

- Fill out an index card
- Text – 251-377-4495

Cost of Project Engineering and Impacts on Project?

Our project is:

- Process Industry
- $200M
- Green field
- Technology provided and not cutting edge
- 5 Full Time owner's engineers for PM and support
- Project is EPC
- Permits done by owner

Cost of Project Engineering?

How much for Project Engineering?

- PE reduces costs.
- Last cost item to look at.
- Who cares?
- Somebody cares.

A Definitive Answer

How much for Project Engineering?

Answer:

- Front end? 1-2%
- Detailed design? 8 – 12%
- Construction Management? 6 – 8%
- Start up assistance? 1-2%
- Documentation and Clean up? Included above.

Project Engineering
Over / Under

- How does it happen?
- What are the consequences?
  - Cost
  - Schedule
  - Quality
- How do you get it just right?

The Experts Say:

CAUSES

- Underestimation.
- Lack of definition.
- Engineering costs become significant.
- Schedule delays, costs increase, ripples through entire project.

SOLUTIONS

- Plan to get it right.
- Experience in all the right places.
- Get construction involved early.

Questions?

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Ongoing Design – Scope Creep

- How does project engineering minimize the impact of an ever evolving design?
- How do you know when to kill the engineer, finish construction and start up?
- Is this the sole responsibility of the Owner?

Famous Sayings

- Discipline, discipline, discipline.
- Learn when to FREEZE! Live with it.
- Engineers abhor a vacuum. An engineer will fill the schedule.
- Rods up, pencils down.
- Accountability: Project manager, owner. Hold engineers accountable to schedule.
- Could be EPC contractor depending on contracts.

Project Controls

- Definition of Project Controls – Part of the project team dedicated to making sure we do what we're supposed to do.
- Why is this needed?
- Is it a good thing?
- How to determine if it is worth the cost?
- Keys to execution

We all agree!

- Absolutely necessary.
- Can’t manage project by “feel”?
- Cost should be minimal.
- Focuses on forecasts, not the past.
- Early warning system.
- Develop the correct project metrics and monitor religiously.

Questions?

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RISK is not just a Board Game.

- Project Engineering is the key component to a successful project. How do we make sure each participant understands and accepts the appropriate risk?
- When is the appropriate time to have clear understanding? Why can't we get it done at the beginning?
- How can we stay out of court?
- Ultimately – Is the owner responsible?

Risky Business

- Clear and concise and proven contract language.
- Address risk and problems immediately, DO NOT WAIT!
- Agree on Project Risk Matrix.
- He who controls risk should take responsibility.
- Anna Karenina Project Model
- Owner should allocate risk contractually.
- Some risks only the Owner can have.
- Owner has to live with it.

Third Part Oversight

- One trend among owners is to have third party oversight of the Engineer and/or Constructor.
- Why is this needed?
- Is it a good thing?
- How to determine if it is worth the cost?
- Keys to execution

Survey says!

- Inexperienced Owner
- Limited resources available.
- Roles defined and communicated
- Danger of competing agendas
- Adds cost and redundancy
- Owner has to evaluate his/her Project toolbox

Safety

- How can Project Engineering influence:
- Construction?
- Operations?

Safety Pays:

- Design for construction techniques and risk
- Constructability reviews
- Include construction and operations in all safety reviews
- Detailed planning on sequence of construction
- Project Engineering need to insure mindset

Third Party Technology Providers

- How do you integrate a third party technology provider into the project team?
- Owner?
- Engineer?
- Constructor?
- How do you handle the risk?

Get it straight up front

- Contractual synergy – all parties
- Assigning risk adds cost
- Define responsibilities and deliverables
- Performance guarantees

Communications

What is the biggest hindrance to communications:

- Owner to Engineer?
- Engineer to Constructor?
- Owner to Constructor?

Then how to improve?

Get Personal:

- Owner be full time present.
- Talk, don’t email.
- Get goals aligned and check often.
- Meet face to face.
- Then talk some more.

What is the Future? Is the Future Now?

Project engineering becomes more critical?

- Craft labor shortage/ skill deterioration?
- Professional labor shortage?
- Modularization in all it's forms

Matt says:

- Blatant advertisement – Go to the forums on this stuff.
- Send in evaluations


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