

Welcome!

LPPDE Virtual Summit – March 2024

*Lean Decision-Making in
Industrial Capital Projects using
the Choosing by Advantages
System*

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Executive Overview – Fluor Corporation

- ▶ **A global, publicly traded professional and technical solutions** provider
- ▶ **Designs and builds** well-executed, capital-efficient projects for clients around the world
- ▶ **More than 110-year heritage providing solutions** for clients through our Energy Solutions, Urban Solutions and Mission Solutions business groups
- ▶ **Global execution platform** serving clients in over **60** countries
- ▶ **#303** on the 2023 **FORTUNE® 500** list
- ▶ **30,000** employees executing projects globally



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OUR PURPOSE

**WE BUILD
A BETTER WORLD**



ENERGY SOLUTIONS



URBAN SOLUTIONS



MISSION SOLUTIONS

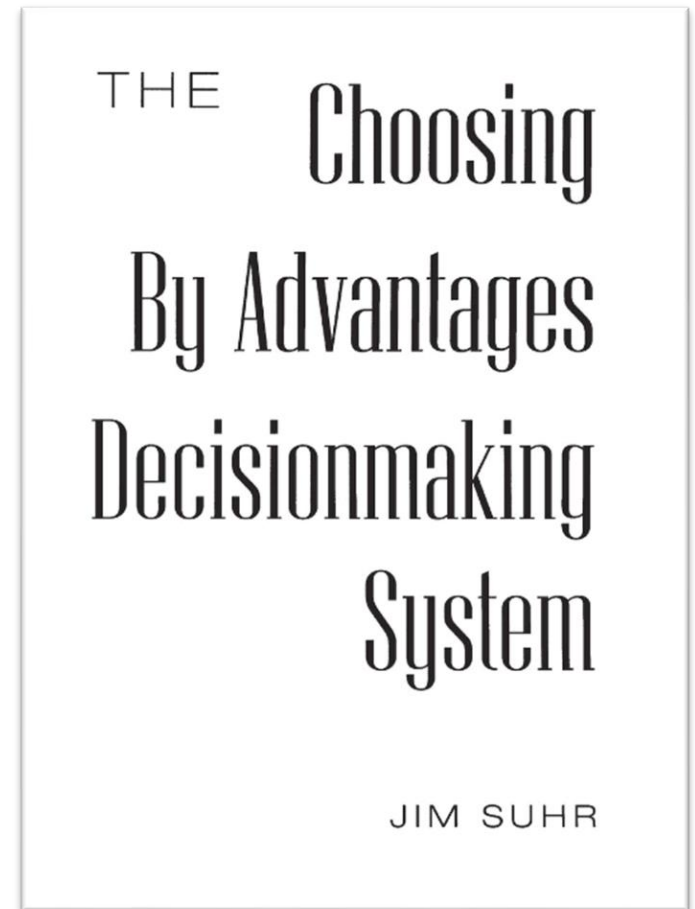
The Challenge

- ▶ Large company, multiple offices working on projects, clients distributed (large organizations), many vendor systems and subsystems to integrate into our designs
- ▶ Misalignment can cause backtracking and rework, impacting design effort, materials and construction, make projects cost more and take longer
- ▶ Decisions and studies early in the design phase are critical

How can we integrate stakeholders and make decisions in a way that prevents backtracking on projects?

Choosing by Advantages – The Basics

- ▶ Decision making system developed by **Jim Suhr, an American Civil Engineer**
- ▶ Purpose is to help decision makers differentiate alternatives and understand importance of those differences
- ▶ Enhanced **collaboration** of all Stakeholders.
- ▶ CBA is a complete Decision-making Process or System. (Way of thinking & a team game)



An Example – From a real project

Decision to be Made:

Technical Assessment of Utility Seawater System

* Existing facility is facing frequent failures in sea water lines. (possibly due to cracks in the concrete lining, resulting in rapid corrosion of carbon steel pipe)

* Value: this system is critical to plant operation

* Scope: 400-450m length (supply + return)
84" diameter

* Stakeholders: Client operations + maintenance, pipe vendors, Fluor Process Piping Engineering

The team has identified 5 possible Alternatives:

1. New piping system using FRP piping (fibre-reinforced plastic)
2. New Parallel lines, of the same materials
3. HDPE (high-density polyethylene) tight liner in existing piping
4. New Cathodic Protection System to avoid corrosion of the existing carbon steel piping
5. Complex plant operating case to avoid large shut down

In CBA, Decisions are Anchored in Relevant Facts

“A factor is an element, or a component, of a decision”

Ask - “In what factors will there be advantages?”*

- ▶ Nothing subjective, must be specific. Example: weight, maintenance requirement, etc)

Factor 1 – schedule
time

Factor 2 –

Factor 3 –

Factor 4 –

(Work independently, using the chat, list the factors to consider for this decision)

In CBA, Anchoring means Specifying Clear Criteria

► Example:

- Factor: Schedule time (to implement the alternative)
- Criteria: Shorter is better
(or criteria can be a range)

(Work independently, using the chat, list criteria for each Factor)

Factor 1 – schedule
time

Criteria: less time is
better

Factor 2 –

Criteria:

Factor 3

Criteria:

Factor 4 –

Criteria:

* Criteria should be worded in a way to ensure numbers / specifics are the result

CBA – Clear Template to Assist the Team

[illegible]

COST OF IMPLEMENTATION

In CBA, the Fundamental Rule – Decisions must be made by comparing Advantages

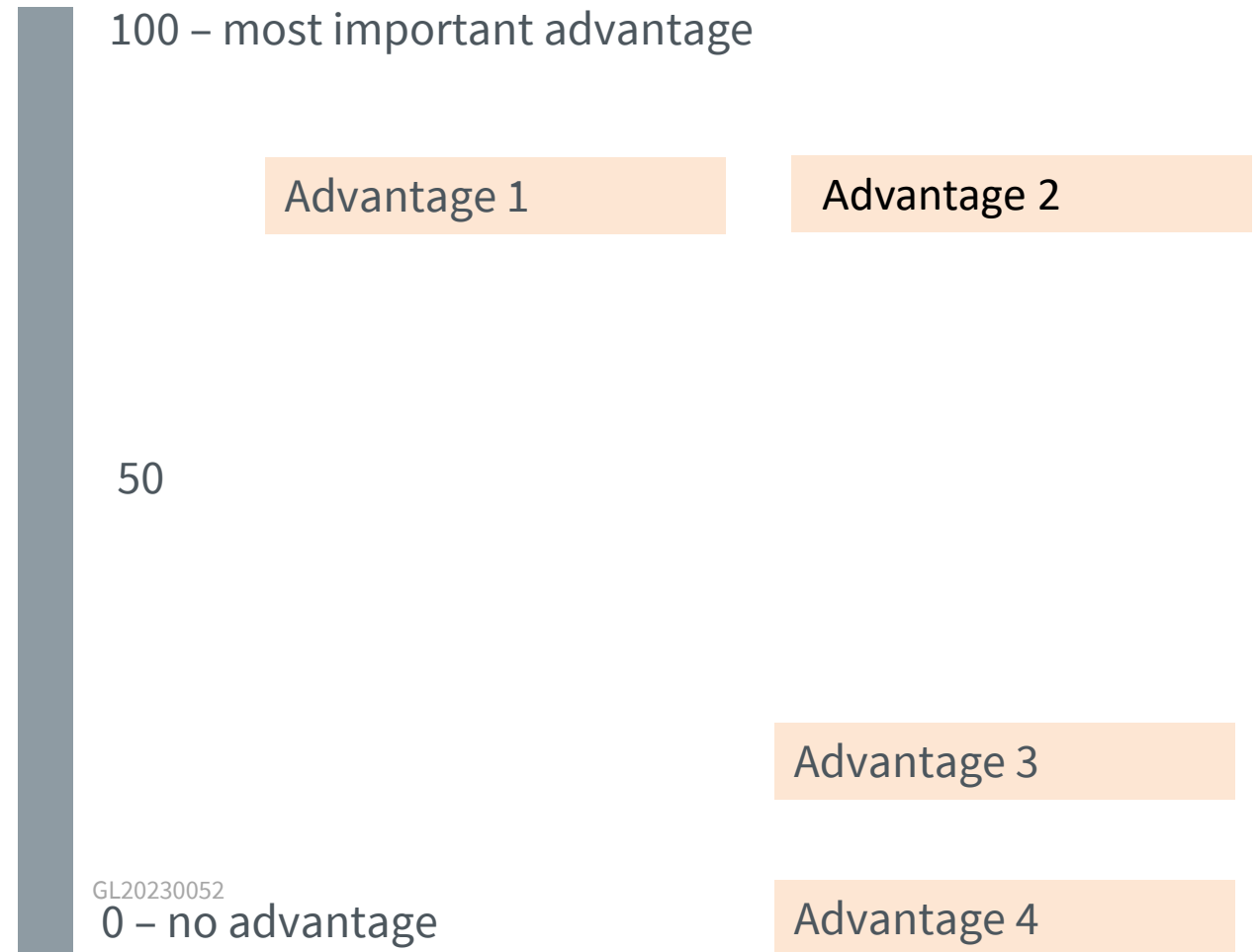
- ▶ Deriving the Advantages:
- ▶ Example:
 - Factor: Schedule time (to implement the alternative)
 - Criteria: Shorter is better
 - Attribute: 10 weeks for FRP (but Parallel lines is 15 weeks)
 - **Advantage: 5 weeks of construction schedule for FRP**

(Go back to Template, fill in all of the Advantages)

In CBA, the Fundamental Rule – Decisions must be made on Importance of Advantage (IOA)

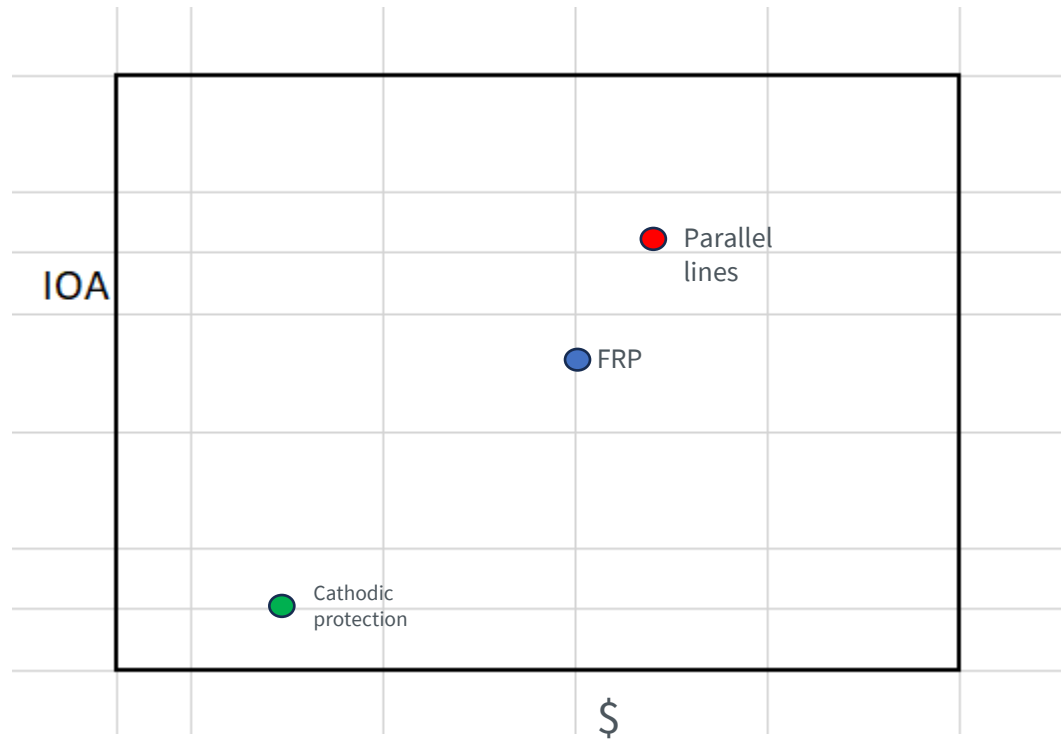
- ▶ As a team, determine the Most Important Advantage

(Think silently and then put your response in the chat)



Summarizing

Now add up Importance of Advantage and plot it with cost



Therefore, why CBA?

TRADITIONAL

- ▶ **Confusion** : Advantages and Disadvantages; Merits and Demerits; Pros & Cons
- ▶ Factors are weighed (Ex. Schedule)
- ▶ Cost is a Factor
- ▶ **Weak Process**: Development in silos
- ▶ Separate decision-making process (TBE/CBE)

Long lead times, Rework later

CBA

- ▶ **Clarity** : Focus on Advantages
- ▶ Advantages are weighed (Ex. 6 weeks of schedule)
- ▶ Cost is not a factor (Net Advantage vs Cost)
- ▶ **Robust Process** : Multi-disciplinary collaborative development

Correct decisions , 30 to 50% less time

Conclusion – Choosing by Advantages

Draws in the right stakeholders

Report writing limited

The structure removes biases and group-think

Involve stakeholders directly, rather than talking in generalities

Prevents rework later in the project

Can be applied in many industries

...Can help in daily personal life

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Proficiency in CBA

“NOTE: Proficiency in CBA is required in order to use it; inexperienced use of CBA will likely result in poor decision-making.”

- Lean Construction Institute

LPPDE Europe 2024 CBA Workshop:

Wednesday, May 15, 2024 Post-Conference Workshops

Workshop Track 4

🕒 08:30 -
12:00

**Lean System of Decision Making with particular focus
on a System called Choosing By Advantages in Design
and Engineering**

Anand Nicodemus, Fluor



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Thank you

Questions?