

IPA



INDEPENDENT PROJECT ANALYSIS

excellence through measurement

Attack the Real Issues ***Improving Projects in Alberta***

Ed Merrow

May 12, 2015

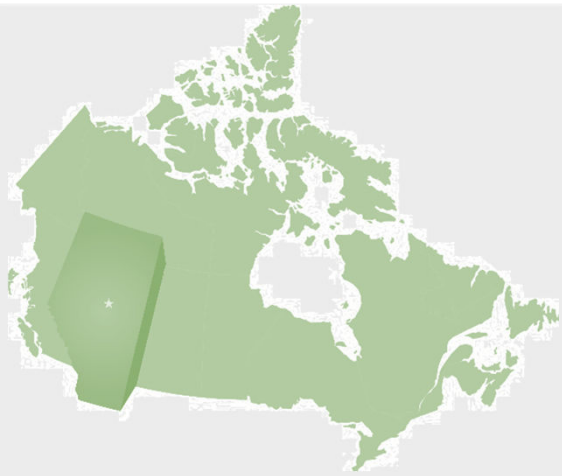
Framing the Issues

- **COAA's focus for projects:**

- Improve construction safety
- Improve labour productivity

These objectives tend to define the problem at the workplace level

- **Workface performance can always be better, but is rarely a root cause of project problems**



Is safety performance in Alberta really poor?

Is labour productivity really poor?

If either is true, why is it true?



Outline

- *A Reality Check*
- **Benchmarking Alberta**
 - **Clarity of Business Objectives**
 - **Quality of Teams**
 - **Following Good Work Process**
- **Staying on Track**

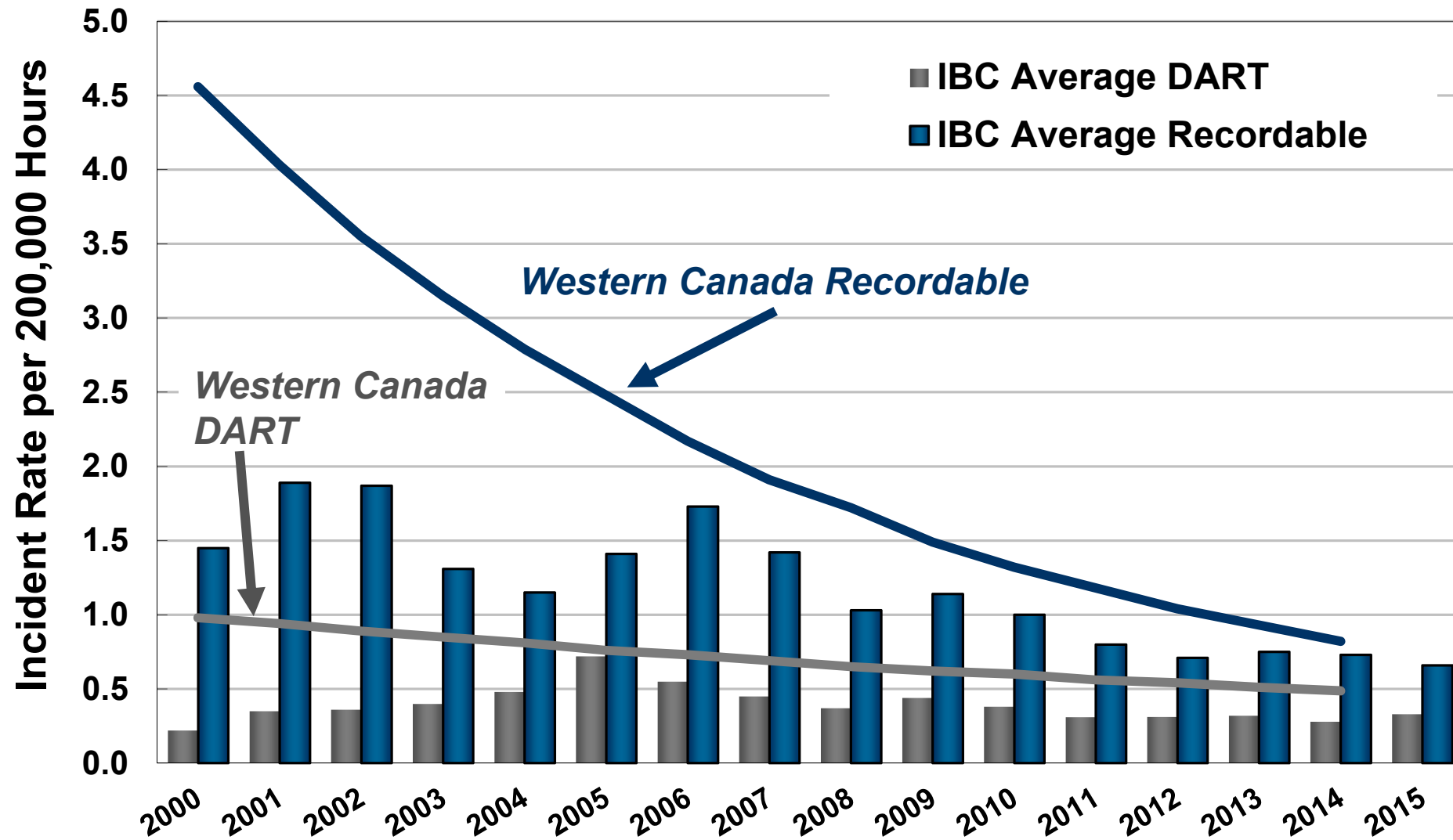
Start With Facts

- **Safety performance in Alberta has improved substantially over the past decade**
- **Recordables in Alberta are now in line with peer companies in the process industries**
- **More serious injuries still lag**
- **Achieving a goal of twice as safe by 2020 is a reasonable target for DARTs, but is a stretch for recordables**



IPA's Core Client Safety Performance Time Trend

Improvement Trend Has Plateaued

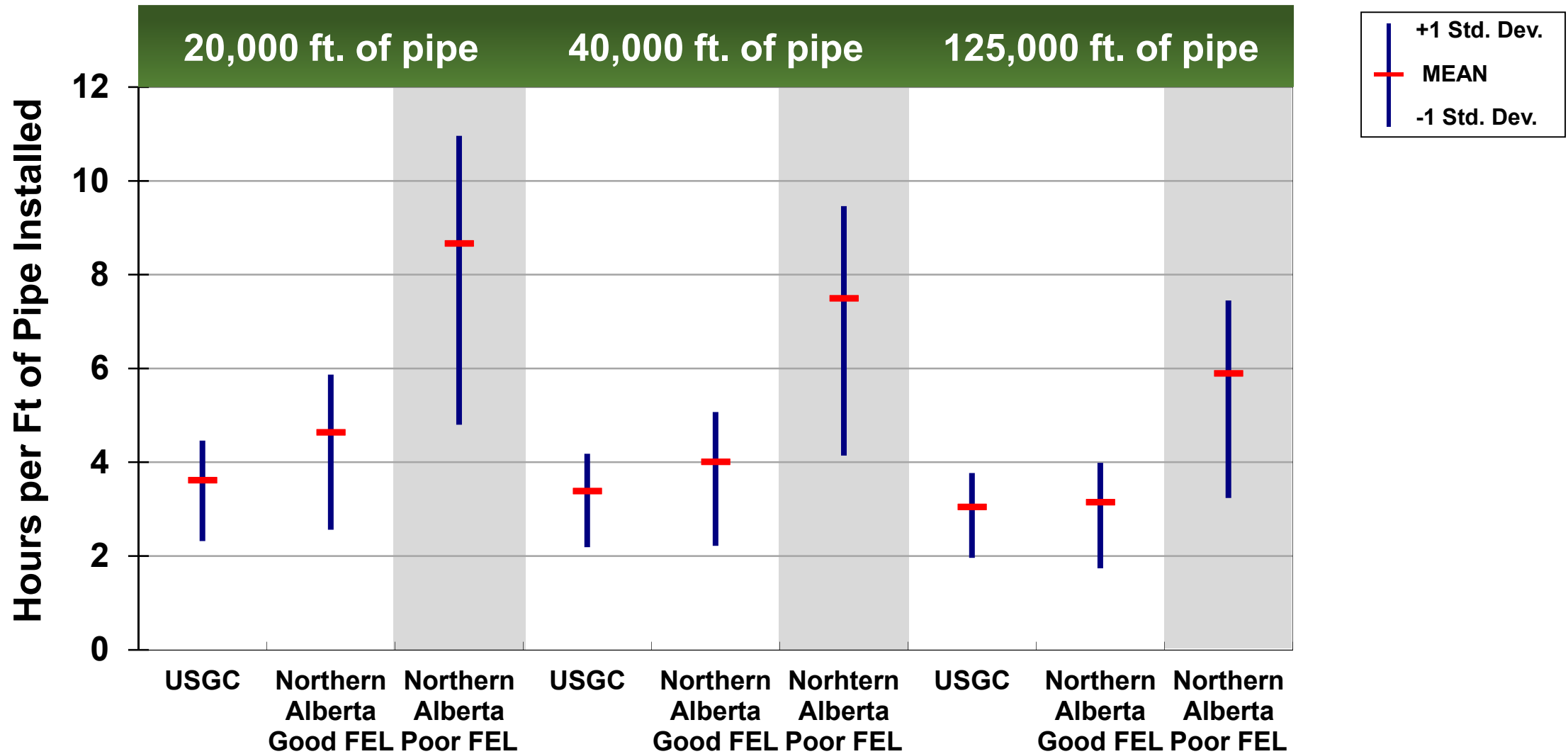




Productivity in Alberta

- **Productivity in Alberta generally is poorer than the US Gulf Coast (greater Houston)**
 - This is measured by hours per quantity (pipe, concrete, steel, conduit, etc.) installed
 - Controlled for weather conditions
- **Productivity in Northern Alberta (above 55° N) is especially poor**
- **But it is incorrect to jump from that observation to a focus on inadequacy in workface planning or poor labour performance**

Well-Defined Projects—Even in Northern Alberta— Achieve Gulf Coast Productivity



Projects from US\$25 to >US\$4,000 million

Engineering Drives Labour Productivity

Drivers of Field Labour Productivity:



The availability of engineered materials



The availability of accurate design

Design and materials
are made available



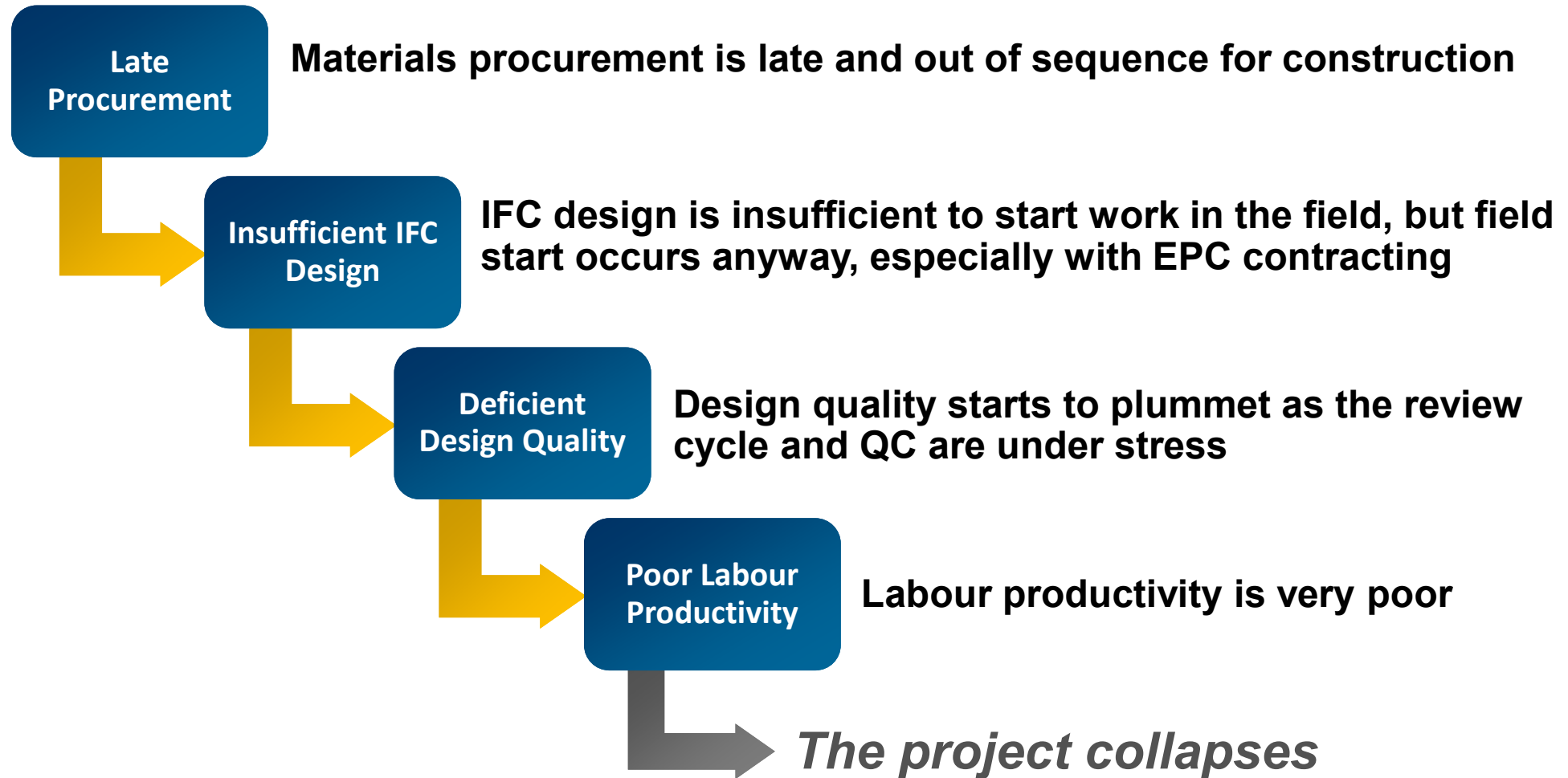
Successful projects
*(even with some of the world's
poorest labour)*

Design and materials
are not made available

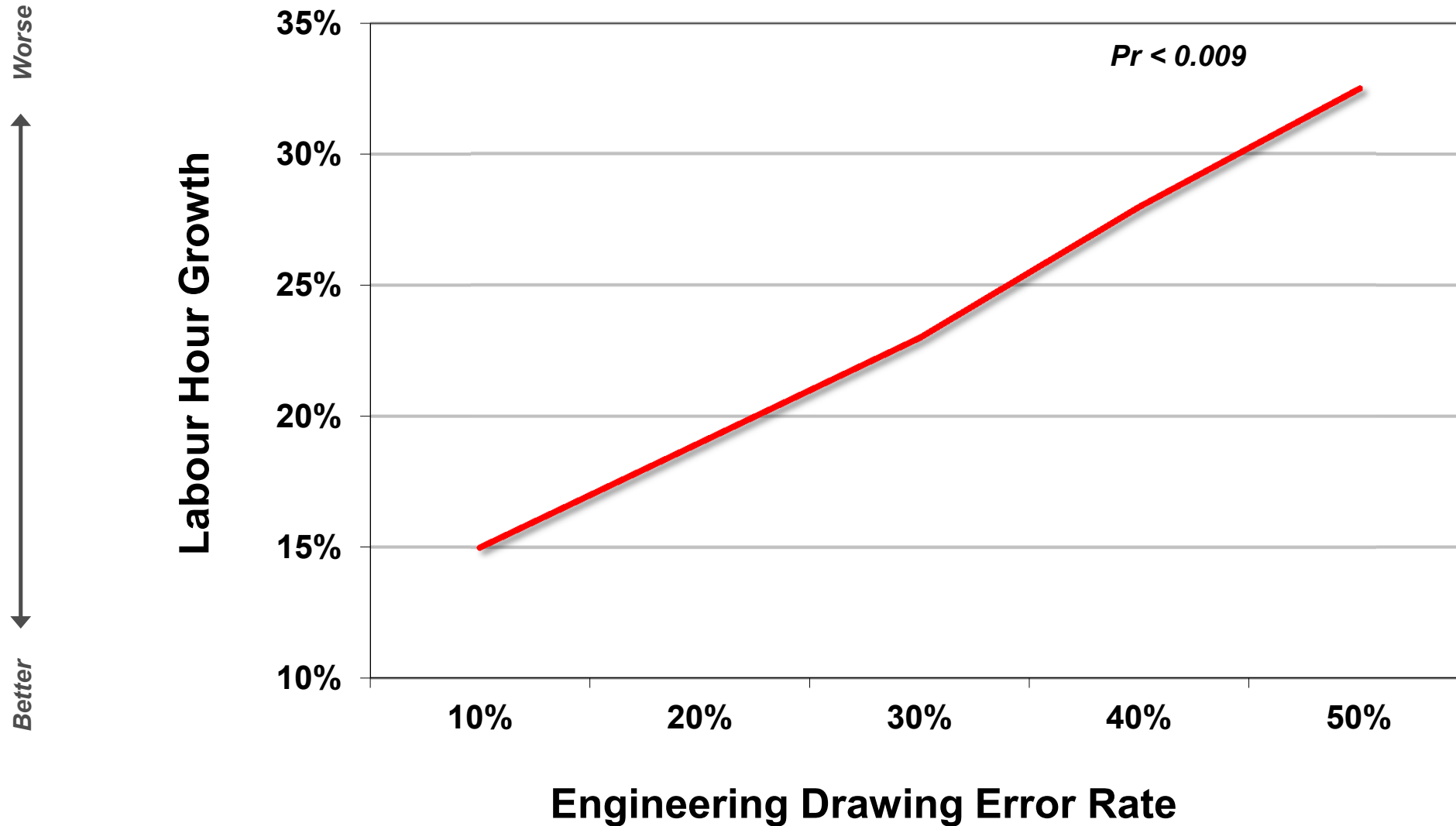


**World's best labour using the
best workface planning
will generate
pathetic labour productivity**

When Engineering Slips

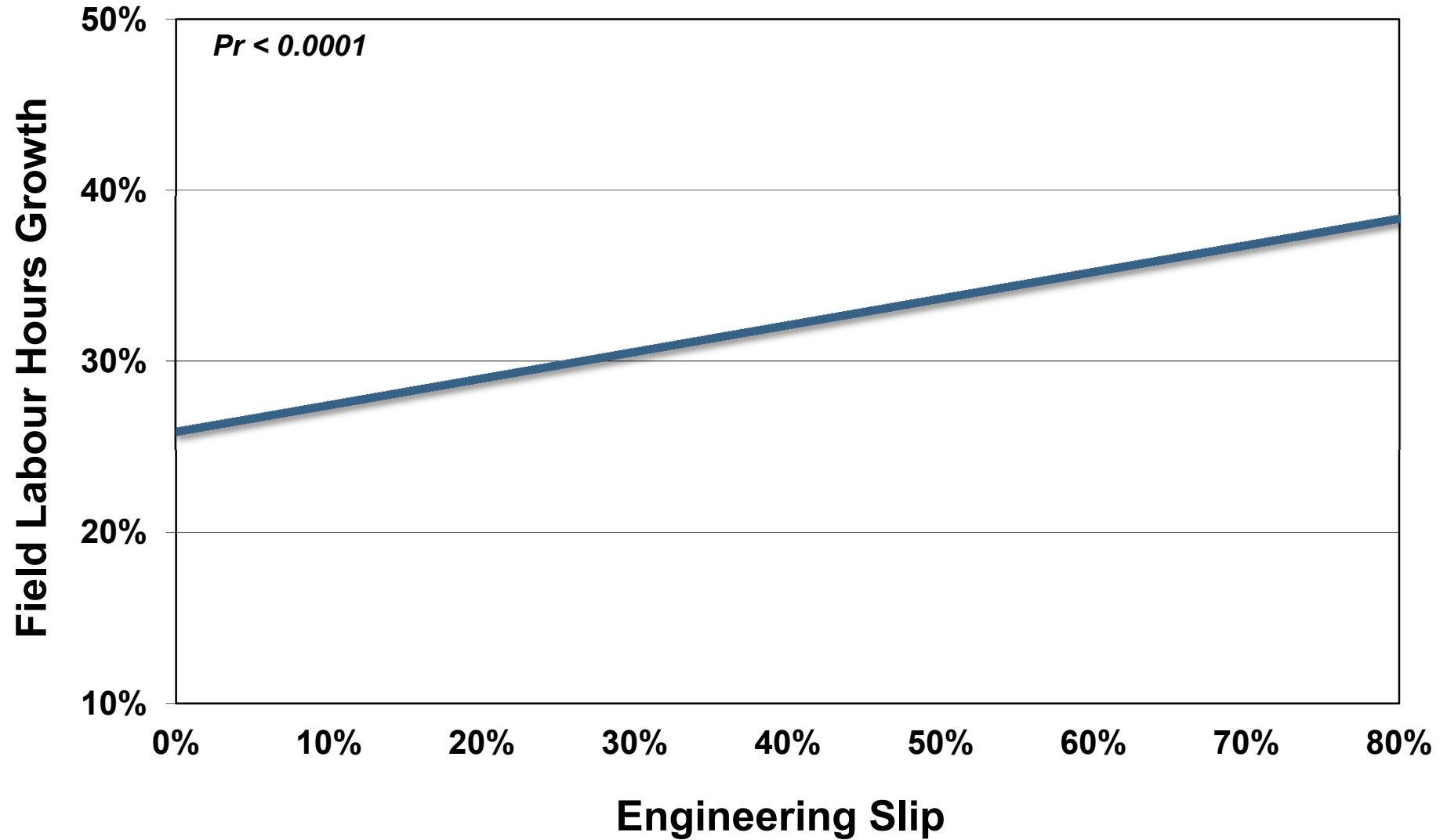


Engineering Drawing Error Rate Affects Labour Productivity

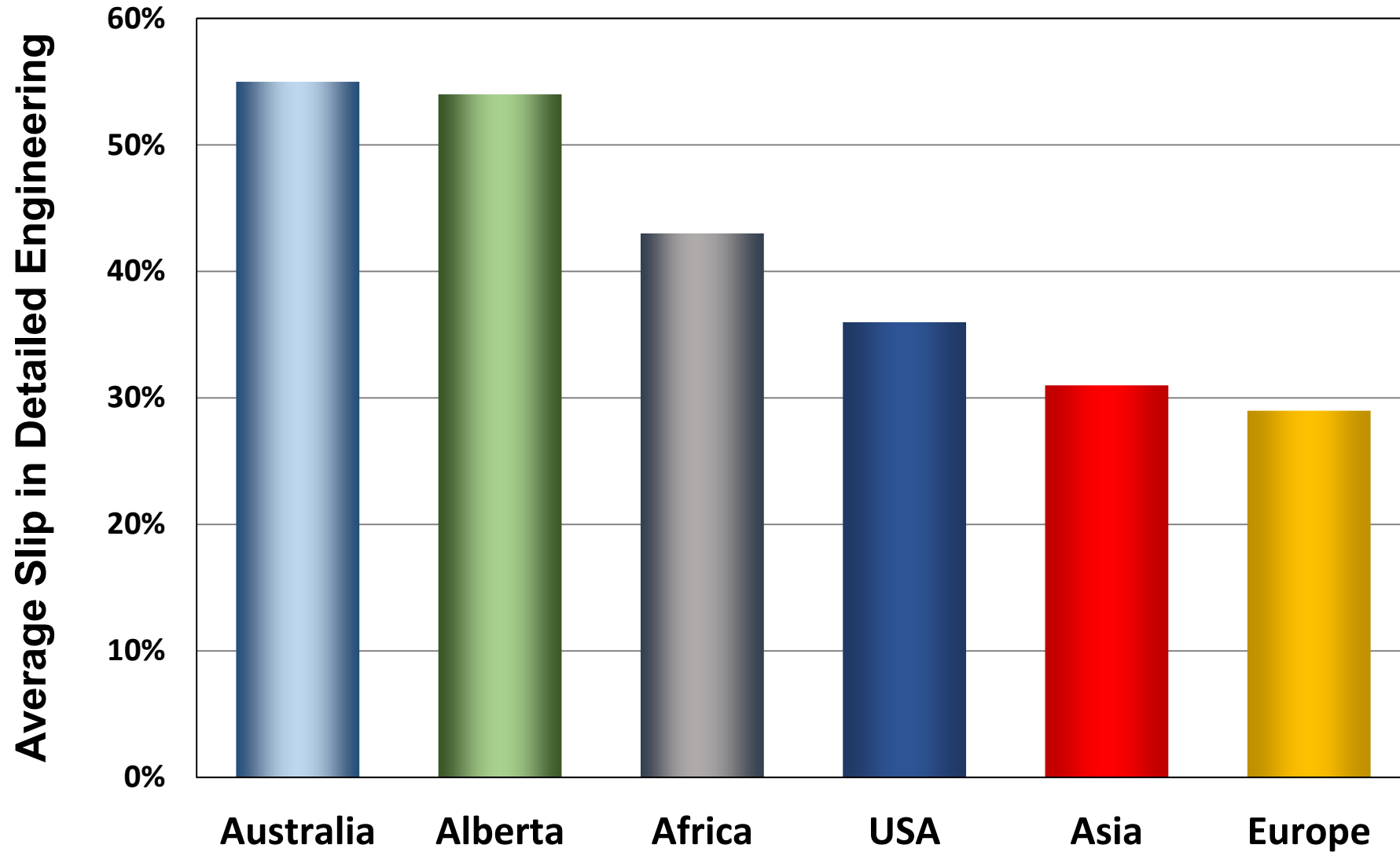


Controlled for multiple factors

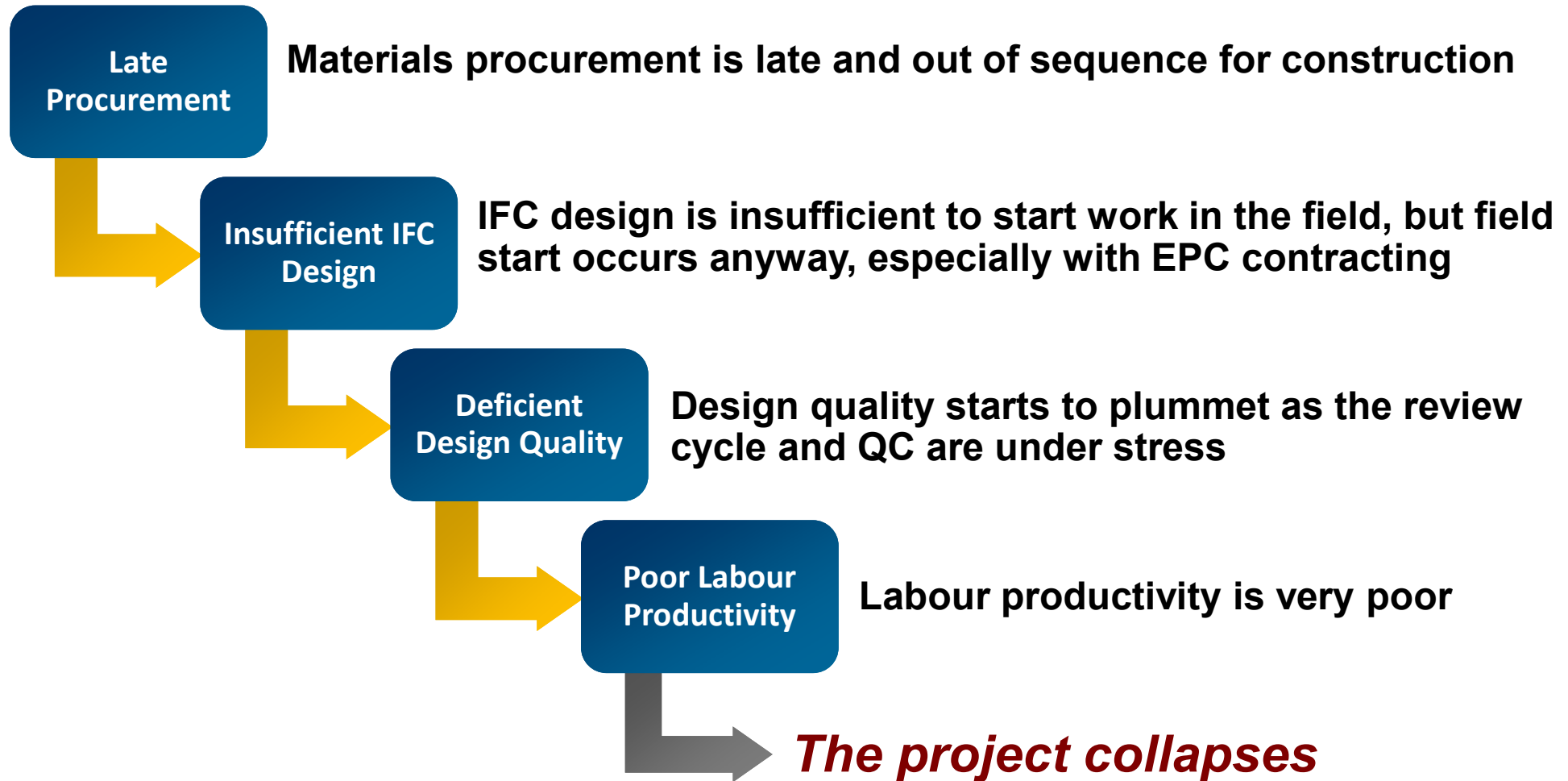
Engineering Slip Drives Field Productivity



Alberta and Australia Lead the World in Engineering Slip



When Engineering Slips



So what causes engineering to slip?



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- **A Reality Check**
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Measures

Business Behavior

- Clarity of business objectives
- Establishment of priorities
- Coherence of the business strategy for the project

Teams

- Presence of all critical functions
- Definition of roles and responsibilities
- Control of team turnover

Work Process Adherence

- Completion of FEED before authorization
- Completeness of the execution planning

Clarity and Coherence of Objectives

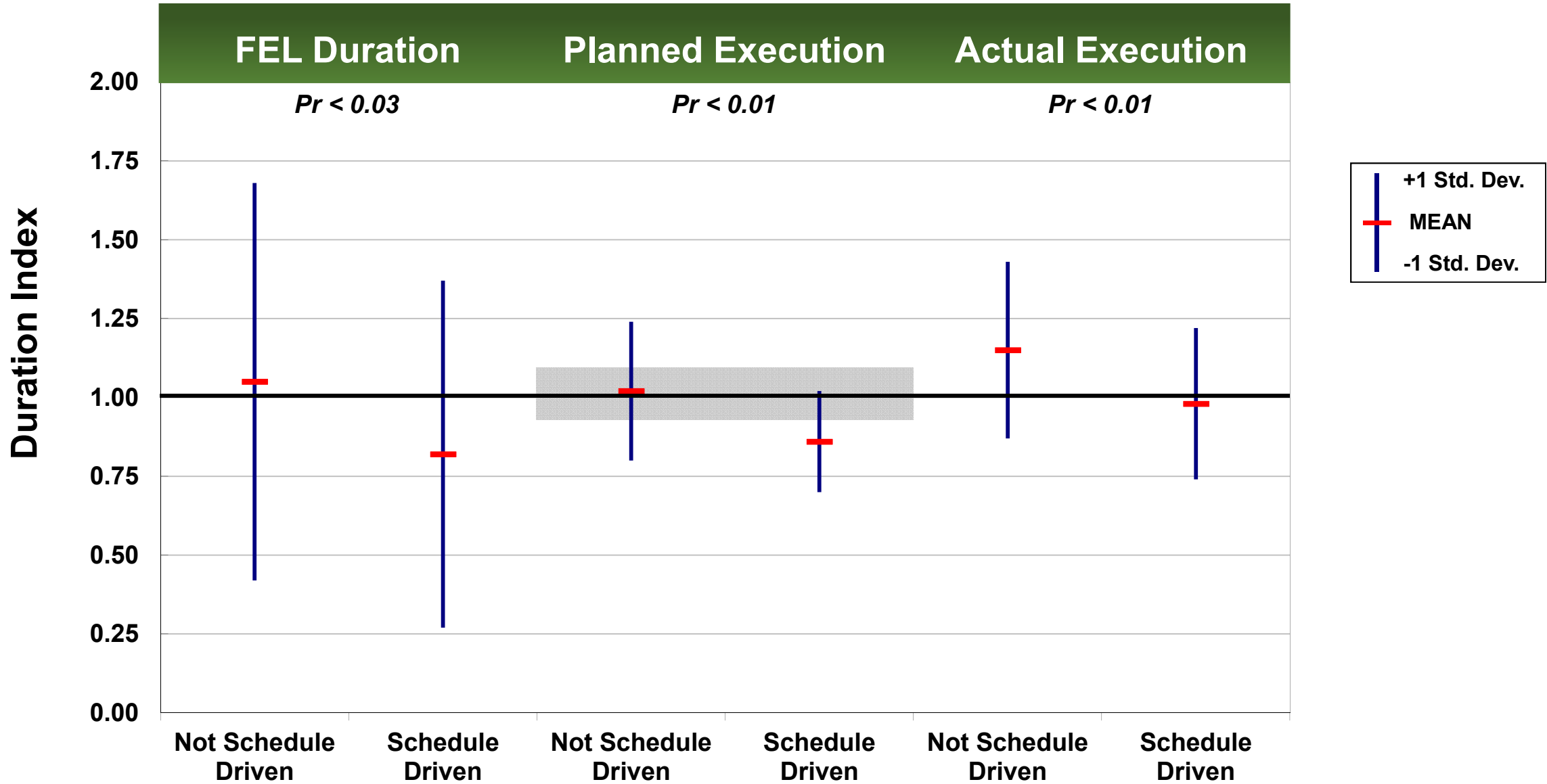
| | Alberta | US | Statistical Probability |
|---------------------------------|---------|-----|-------------------------|
| Objectives Considered Clear | 57% | 66% | < 0.02 |
| Priorities and Trade-offs Clear | 30% | 41% | < 0.009 |



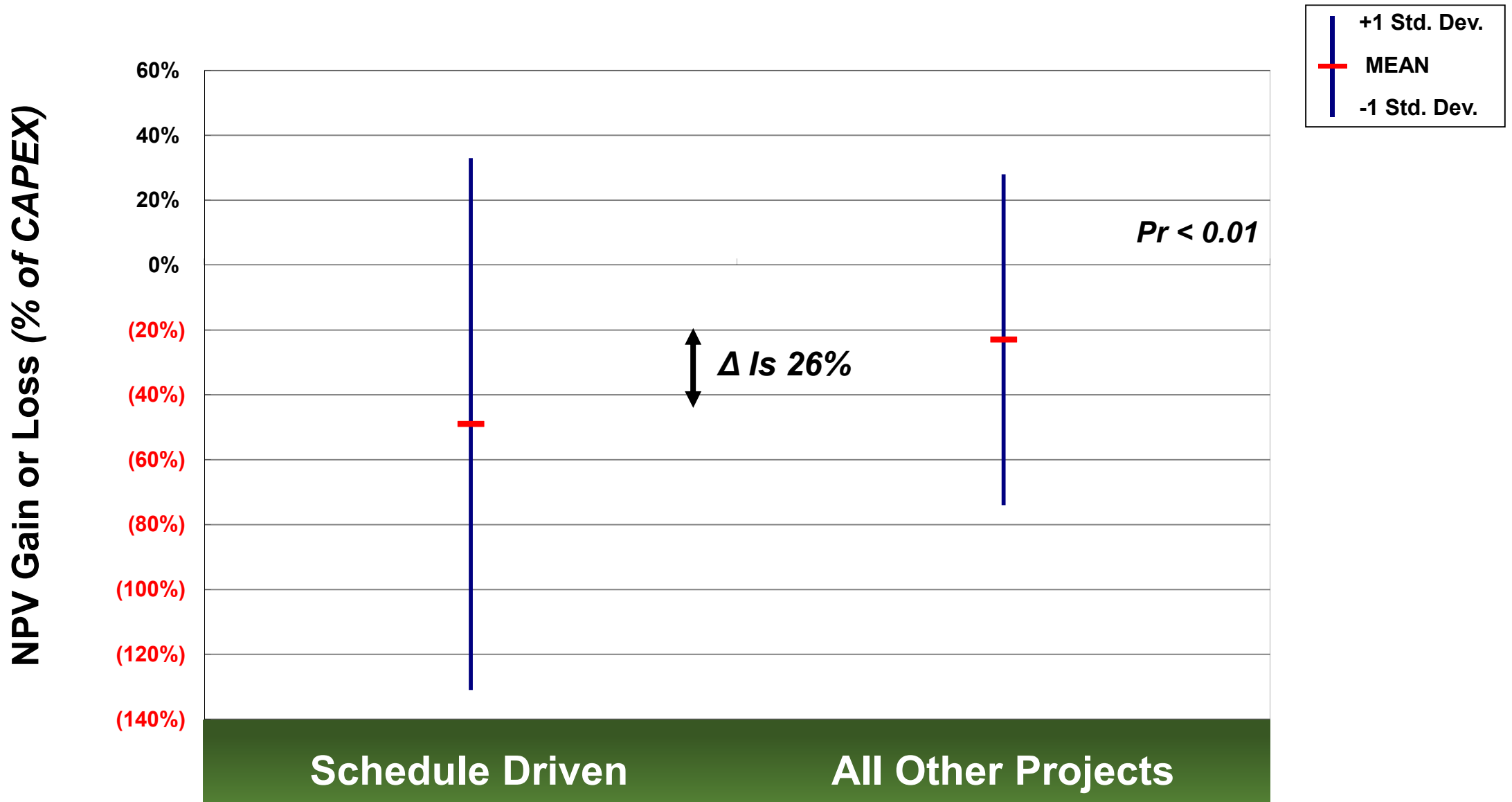
Alberta's Businesses Drive Schedule

- **Almost 100 percent of the projects that IPA has evaluated in Alberta have produced commodities**
- **Commodity sales are price driven and market timing is rarely a significant factor**
- **Yet, Alberta drives schedule on a larger portion of projects than Industry at large, which includes many time-to-market projects in pharms and specialties**
- **There is no difference between northern and southern parts of the Province**
- **No difference by project size**

Schedule Is Achieved...



...but NPV Is Lost





What Is the Problem?

- **The problem with schedule-driven projects is that the practices used, especially on the front-end, were the poorest of any strategy**
- **This is because the speed of FEL is outrunning the resources committed and sometimes even the Basic Data development as well**
- **The bigger the schedule-driven project, the poorer key practices become**
- **Unfortunately, schedule-driven projects are more sensitive to practices than any other group of projects**
- **Because there is no slack in time, mistakes are brutally punished; there is no time for work-around**



Faster Schedules Drive Poorer Practices in Alberta (and the World)

- **Objectives were less clear**
- **Trade-offs were undefined**
- **FEL was poorer**
- **Turnover of team members was higher**
- **Controls were poorer**



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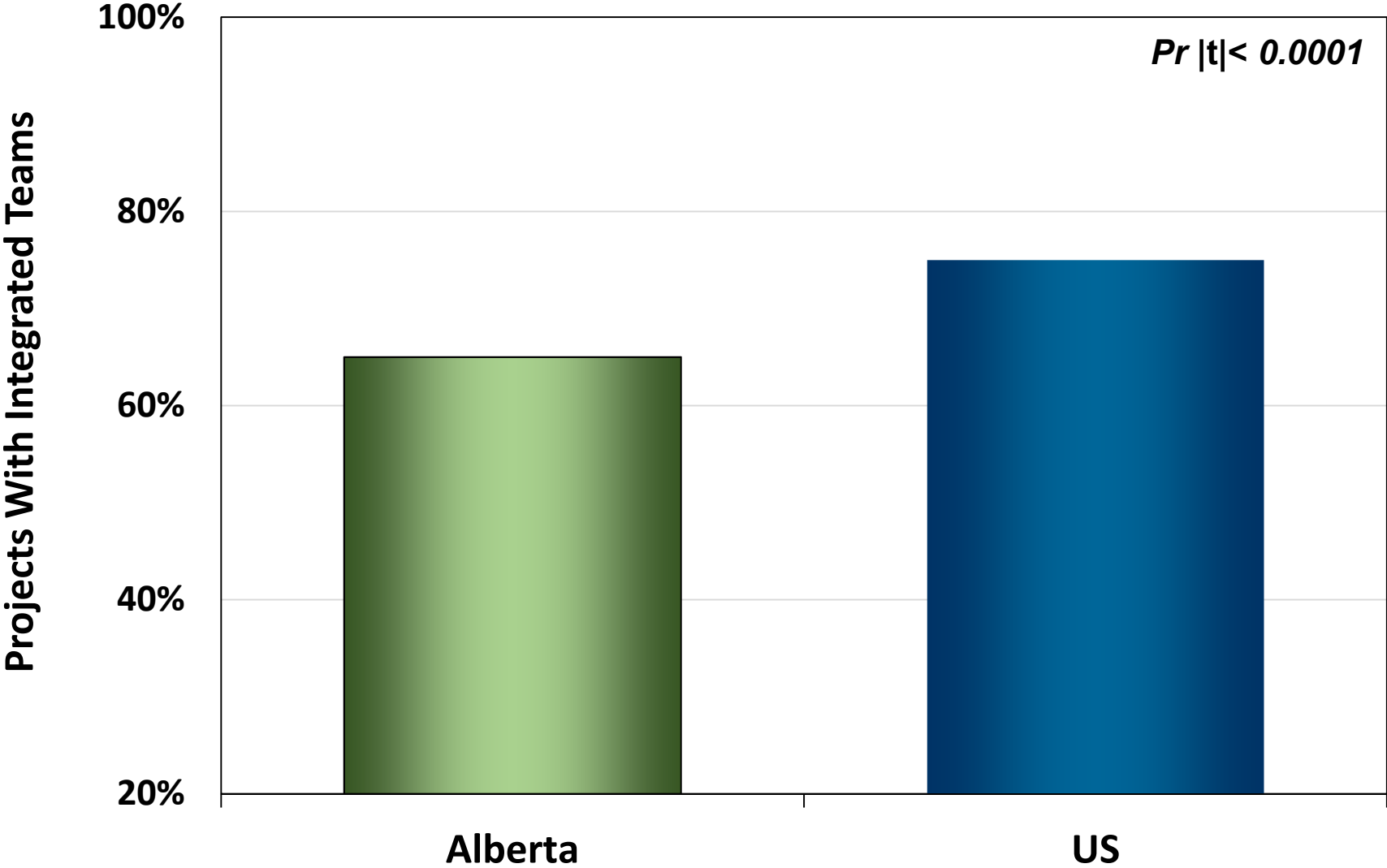
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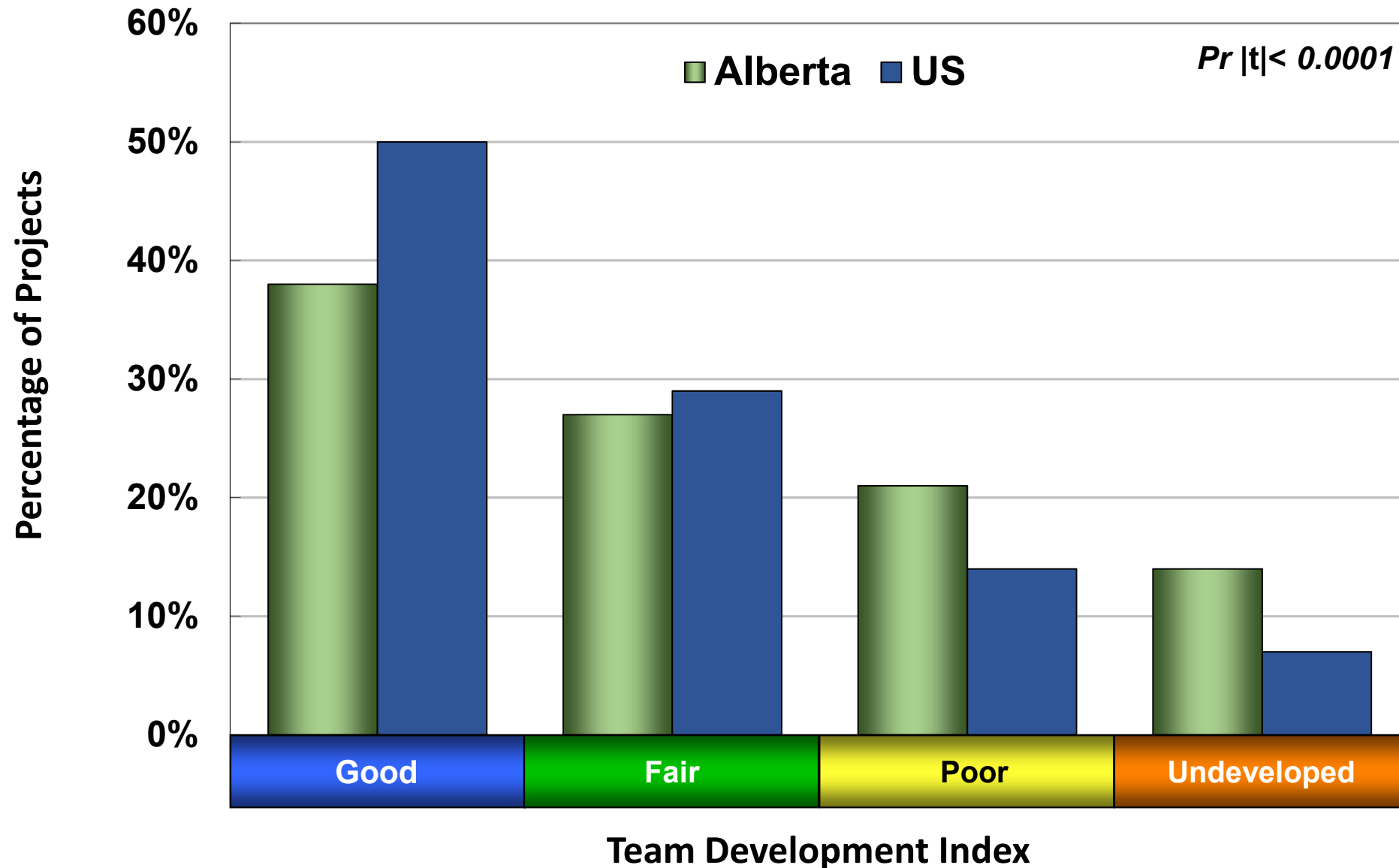
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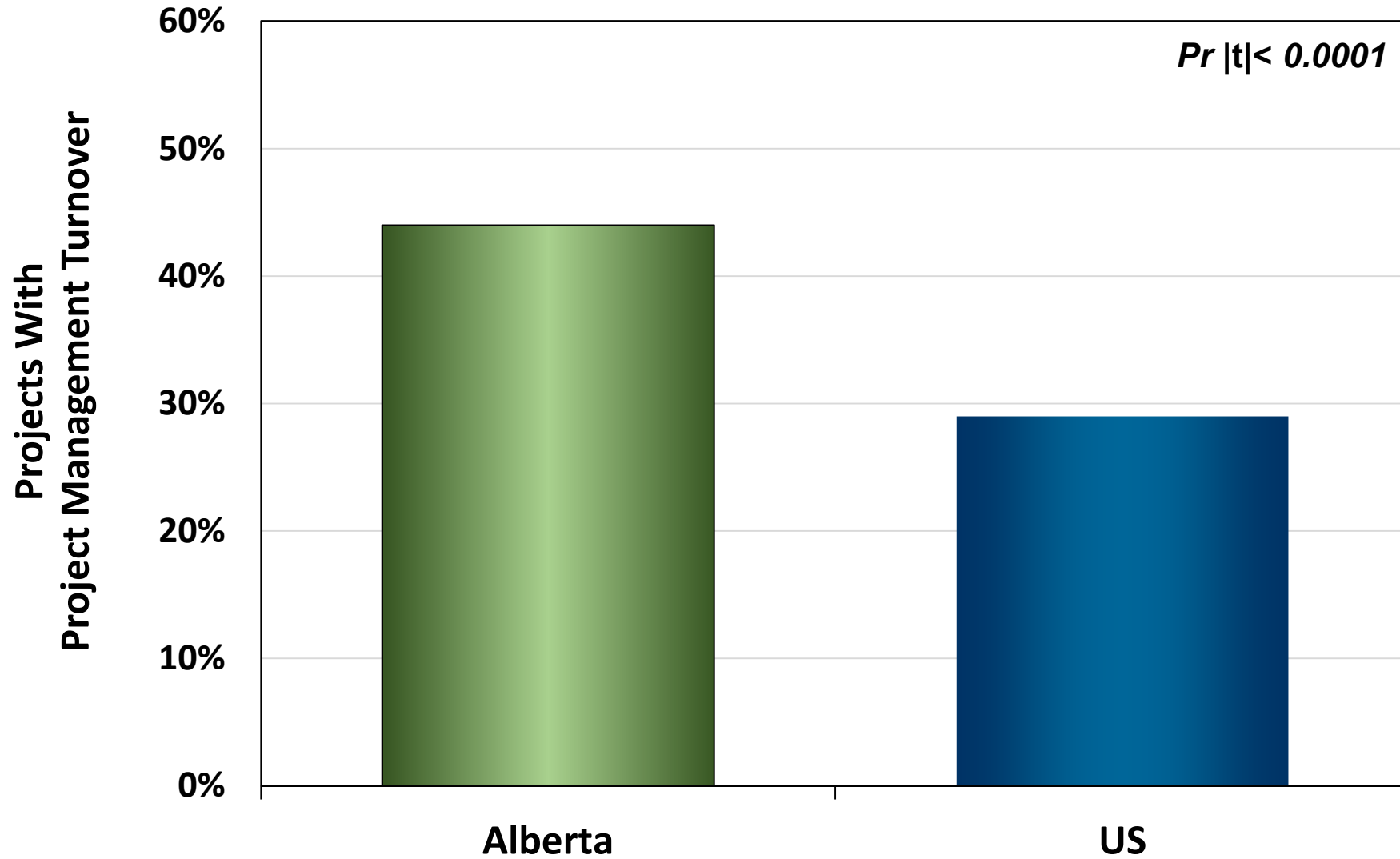
Critical Functions Are Missing More Often



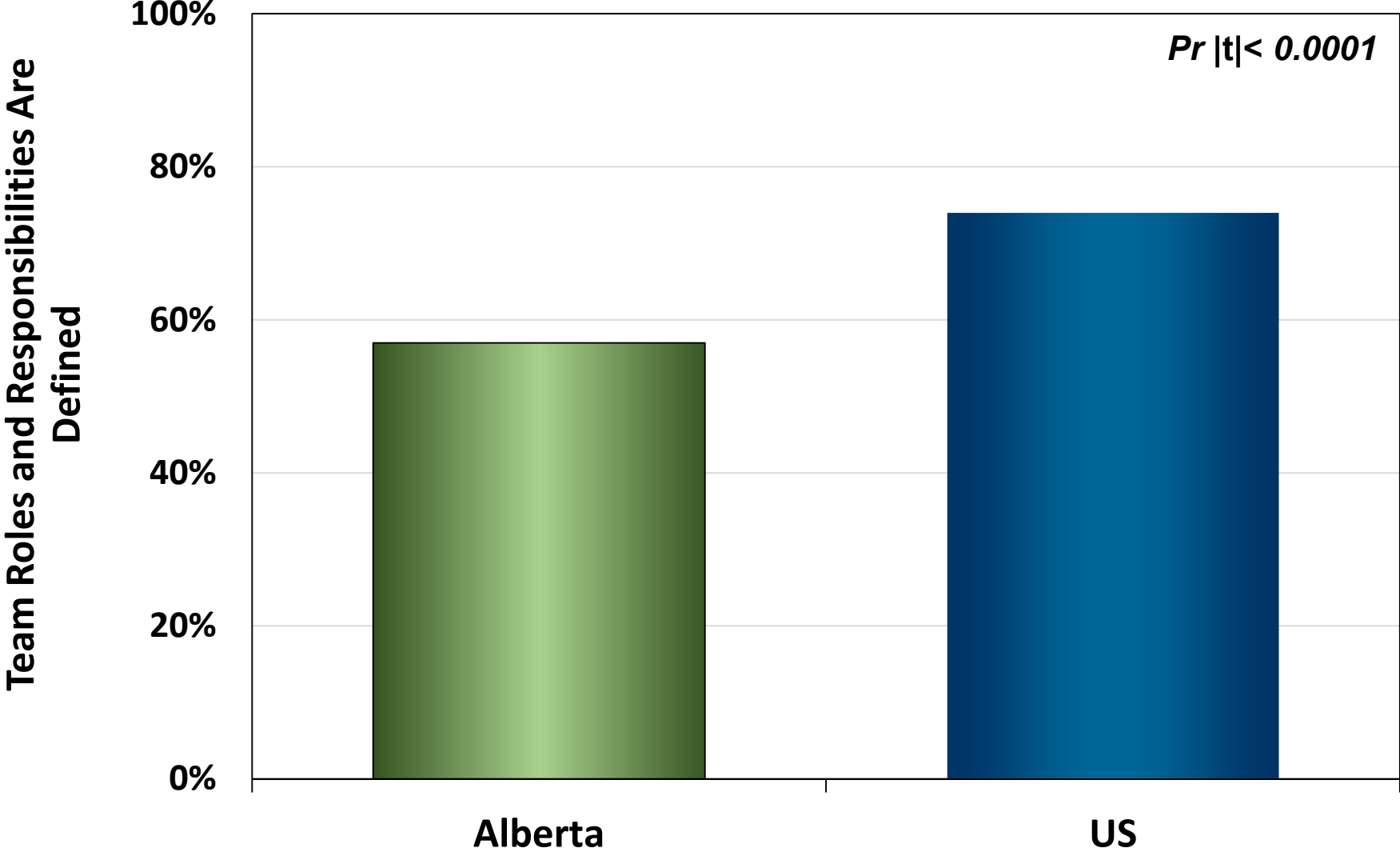
Alberta's Team Development Lags



Turnover of Team Leadership Is Higher



Even Basic Practices Are Followed Less Often





Measures

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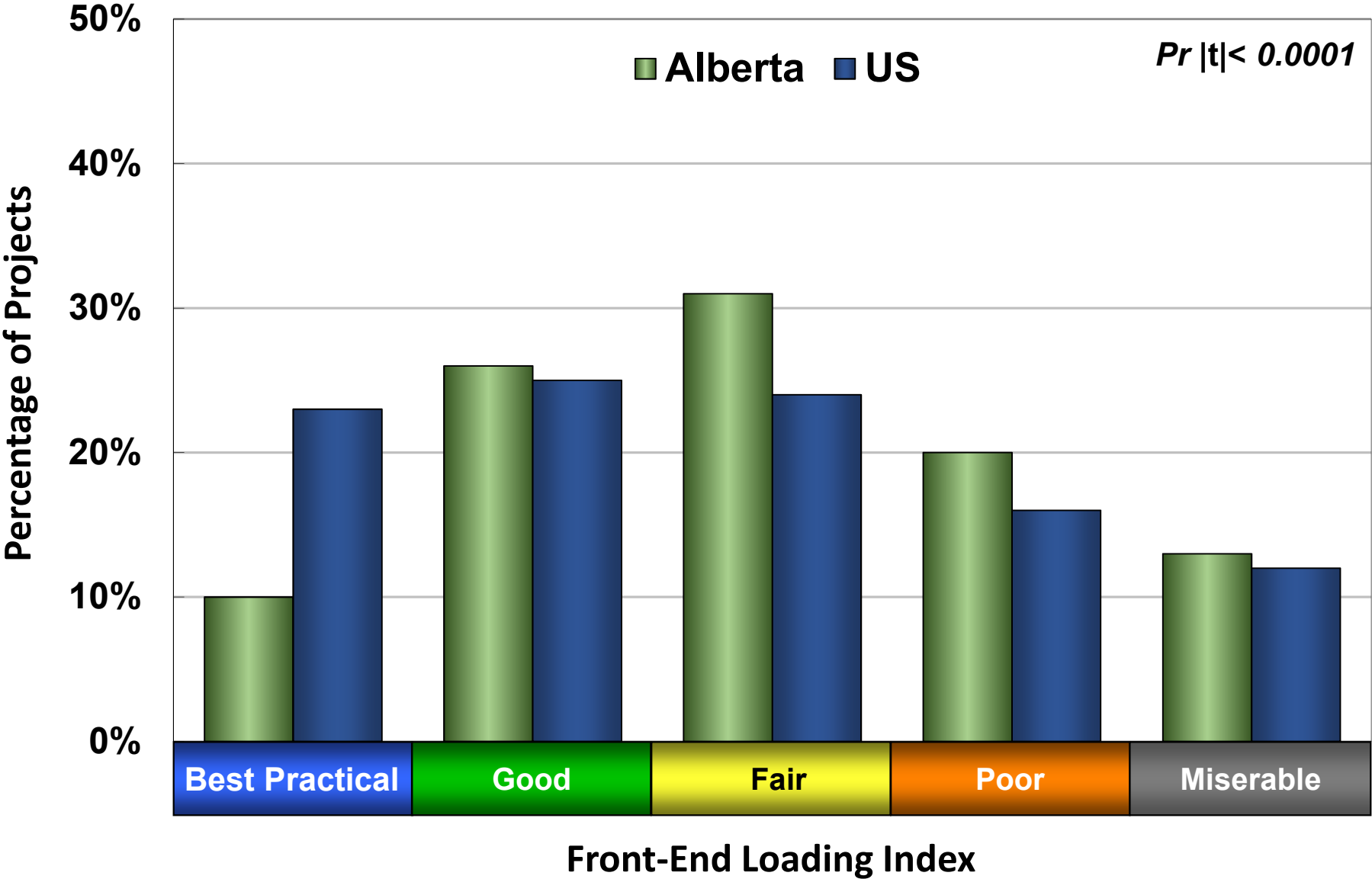
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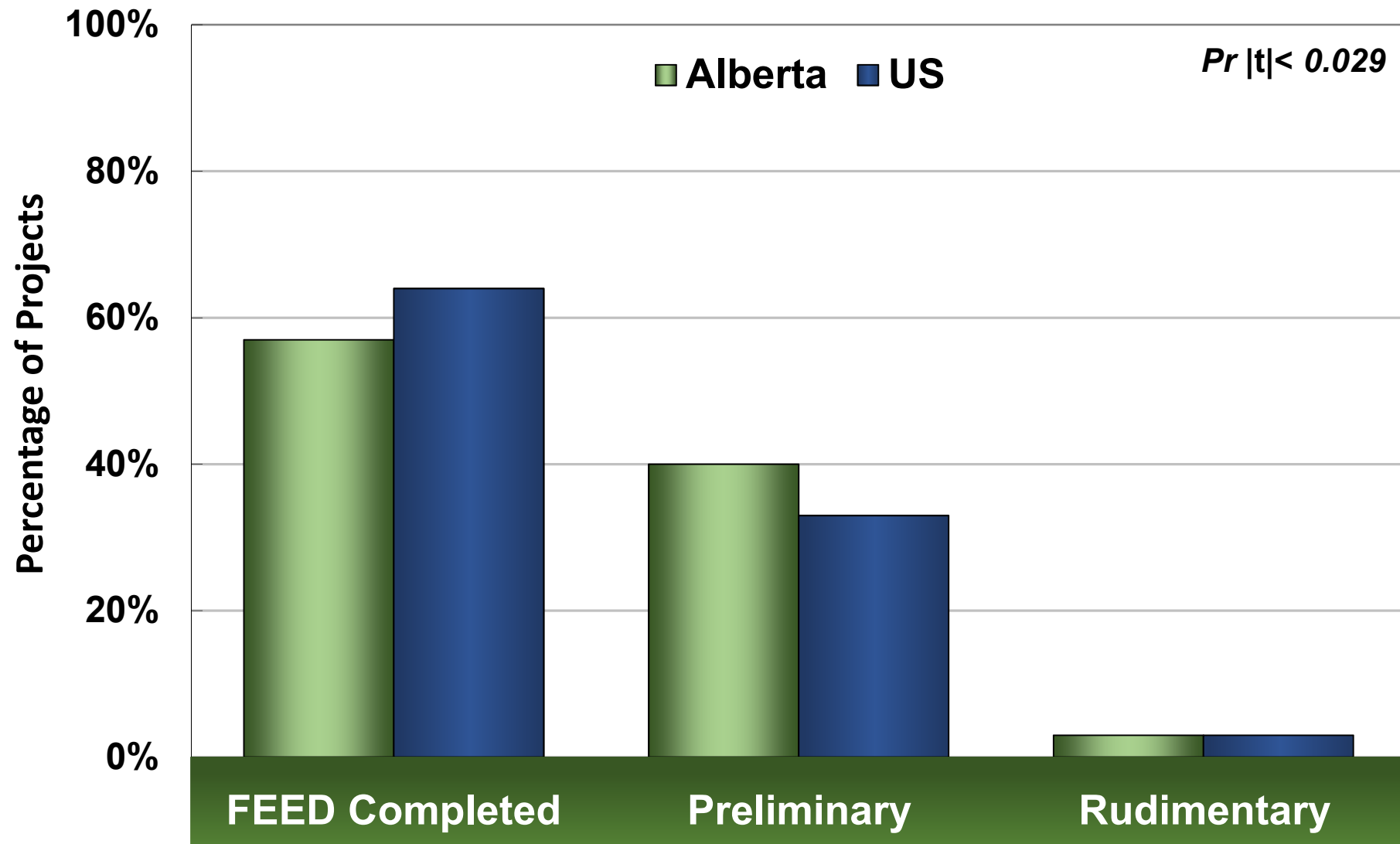
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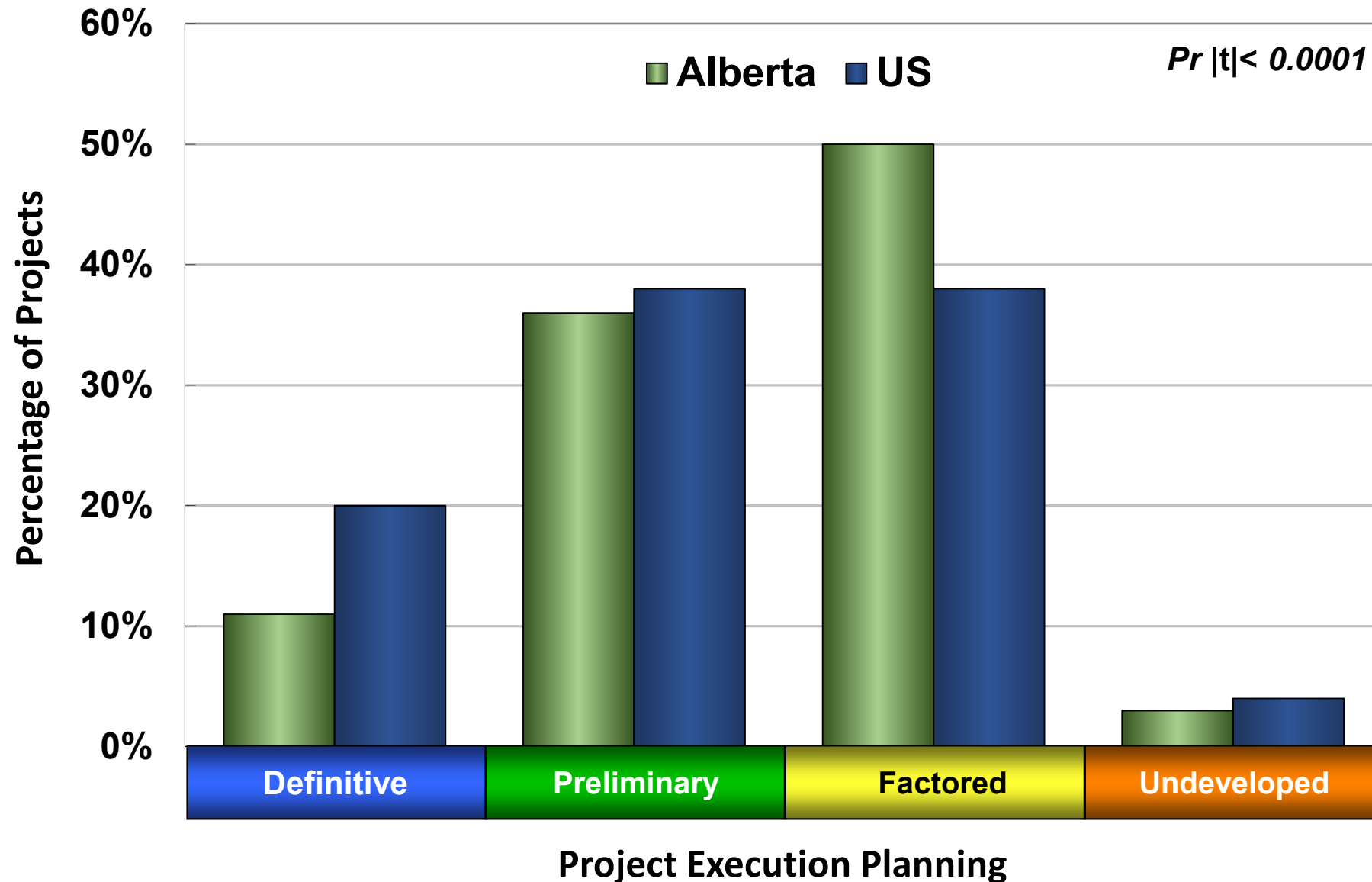
FEL Lags in Alberta



FEED Is More Often Not Complete



Execution Planning Lags Badly



An Alberta Case Study: Practices on Productivity

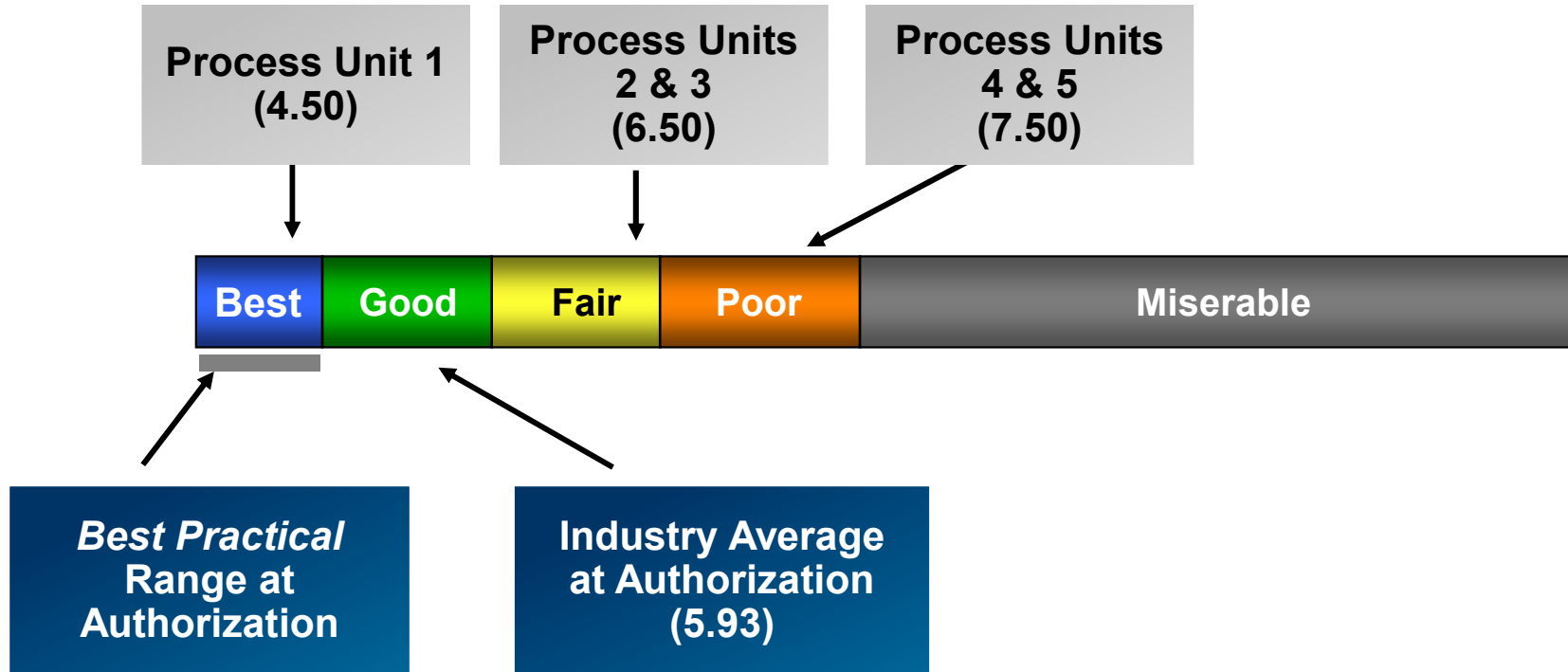
- **Recently completed multi-billion dollar project**
 - Multiple process units
 - Multiple contractors
 - Multiple contracting strategies
 - Differing FEL by process unit
 - Several labour sources
 - Cost outcomes for process units that vary from very effective to ineffective



What can we learn from this experience?

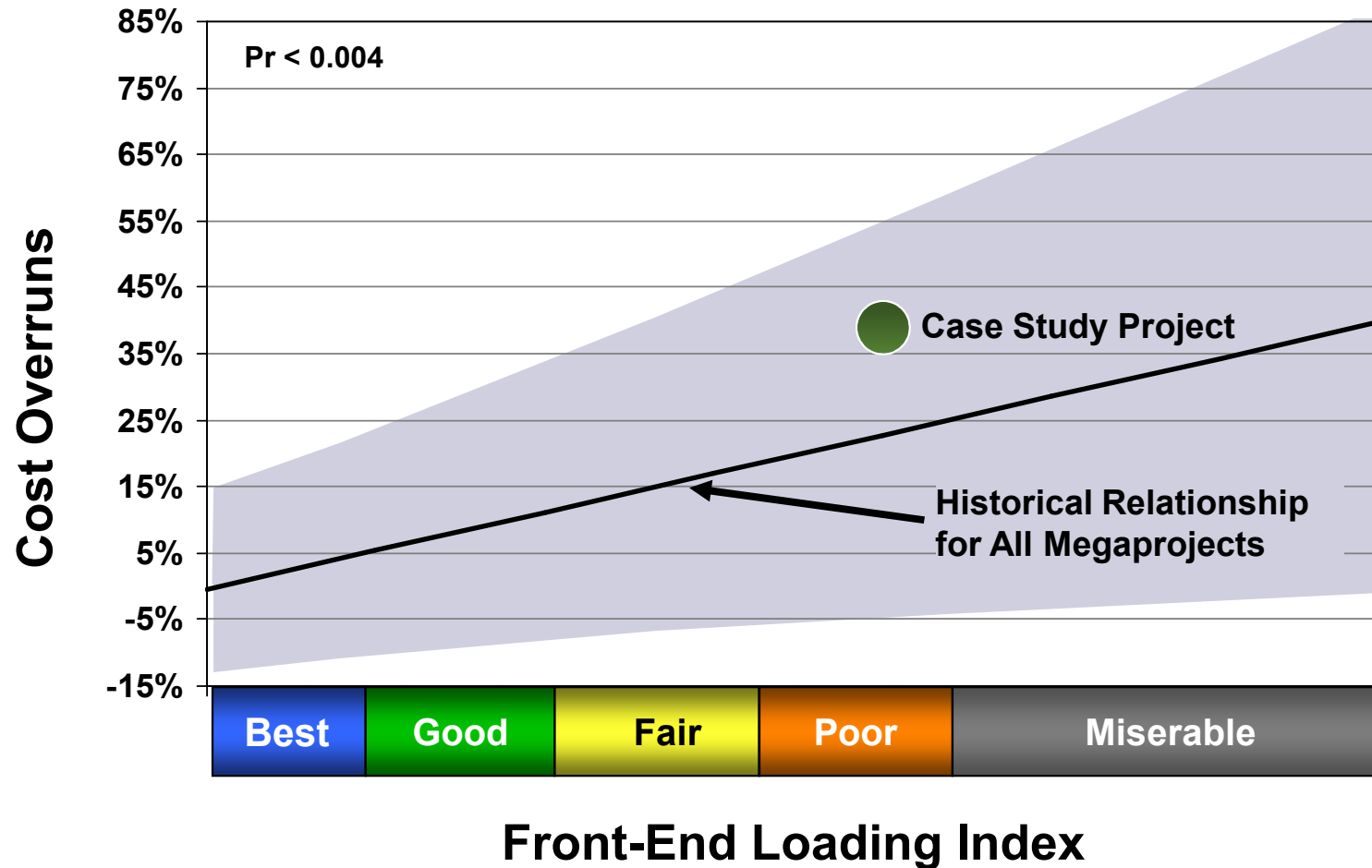
Alberta Case Study—Project FEL Status

Overall Poor FEL at Authorization



Alberta Case Study

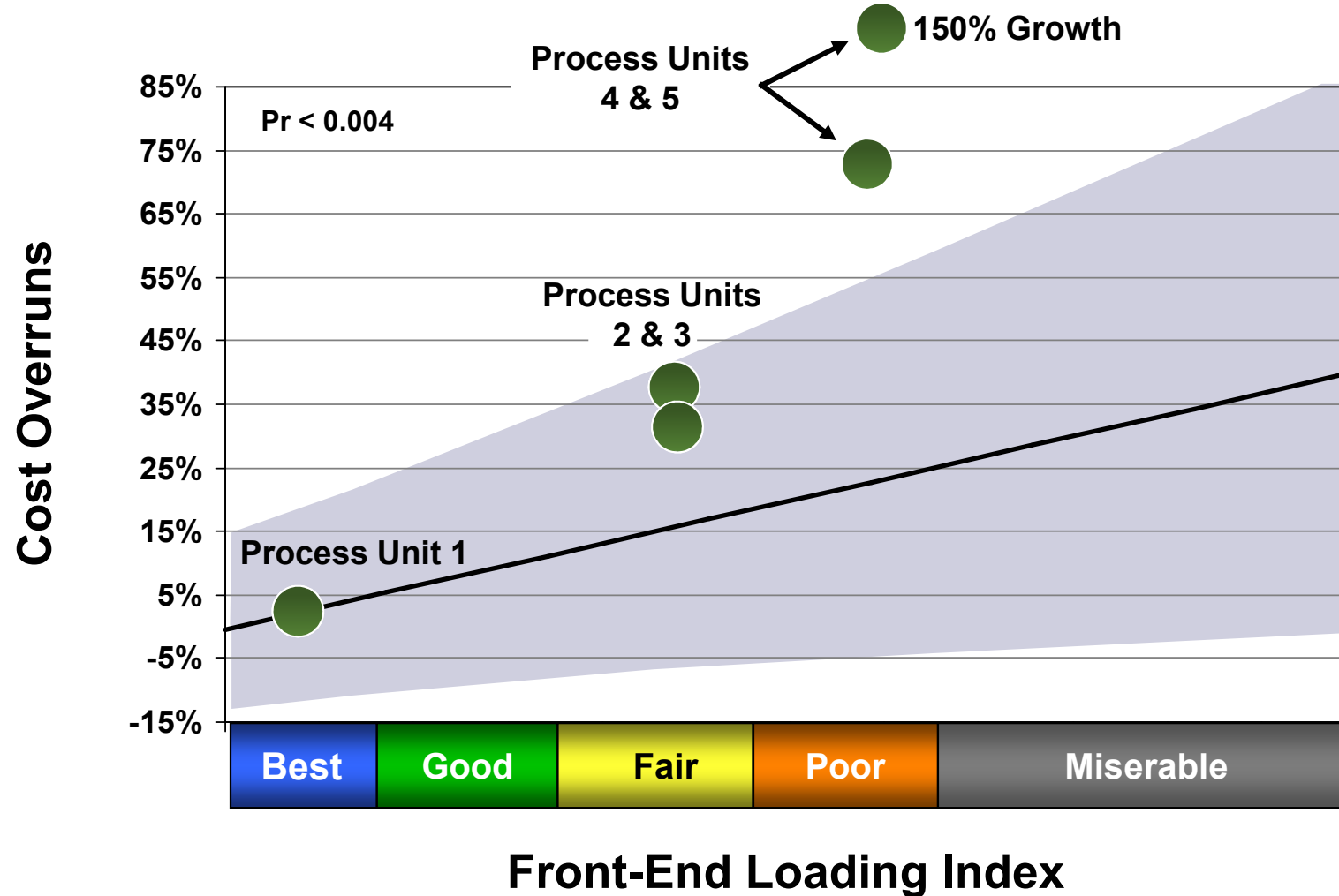
FEL Drives Megaproject Cost Predictability



Shading represents ± 1 std. dev.

Alberta Case Study

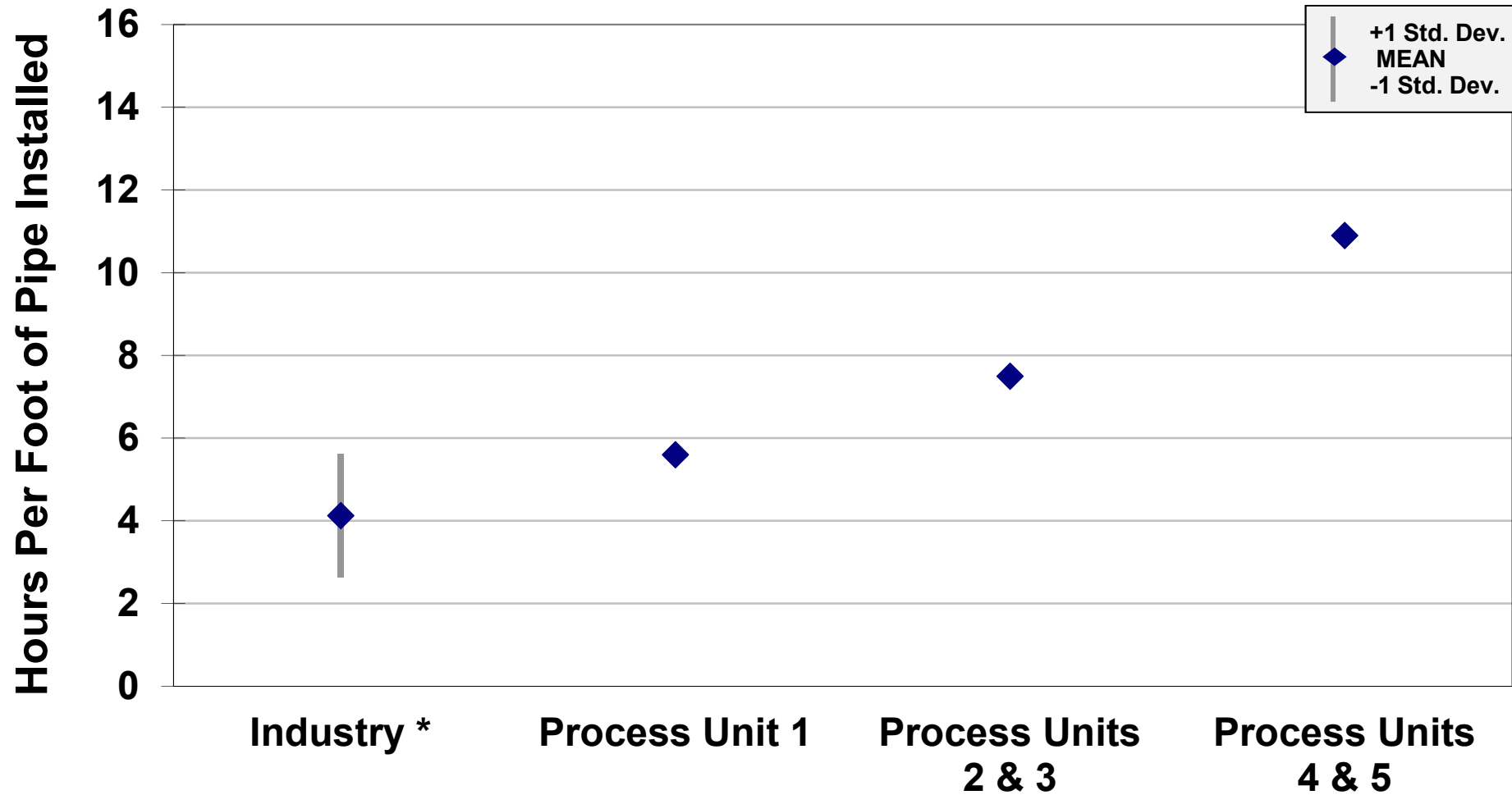
Cost Growth Varied by Process Unit



Shading represents ± 1 std. dev.

Alberta Case Study

Labour Productivity Varied by Process Unit



* CEC industry norms for projects larger than \$250 million



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In Alberta, All Mistakes Are Punished

- **Even with down oil prices and contractors currently hungry for work, Alberta has more projects than its population can easily support over the long term**
 - **Engineering markets are thin**
 - **Craft labour markets are thin**
 - **Projects are often remote**
- **In this environment, any deviations from Best Practice result in outsized penalties—about twice the negative consequences of the same deviation on the US Gulf Coast**
- **Yes, labour productivity is not good**
- **But when practices are best, productivity is excellent**

*Trying to fix productivity at the workface
without fixing the business and project practices first
will be an utter failure*



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