



BENCHMARKING 101

The Construction Owners Association of Alberta has designed this Q&A to help readers better understand what benchmarking is and its importance and uniqueness in Alberta. Click on any one of the questions below to be directed to the answer in this document.

- What is Benchmarking?
- Why is Benchmarking Important?
- What is the History of Benchmarking in Alberta?
- What is Unique About Benchmarking in Alberta?
- How is Productivity Benchmarking Evolving?
- What is the High-level Safety Metric for the Alberta Heavy Industrial Construction Sector?
- What is the High-level Productivity Metric for the Alberta Heavy Industrial Construction Sector?
- *Twice as Safe, Twice as Productive by 2020* – What's It All About?
- What is COAA Doing to Improve Our Industry?
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What is Benchmarking?

THE DISCIPLINE OF MEASURING, COMPARING AND IMPROVING

In short, benchmarking is the process of comparing and measuring one's business processes to industry best. It is a process for identifying, adapting and understanding practices from other companies to help improve one's own performance.

In the context of Heavy Industrial Construction, benchmarking is the discipline of measuring construction safety and/or efficiency, comparing with the medians and quartiles of a statistically significant number of industry peers (locally, regionally or internationally), to identify opportunities for improving.

- Measurement can be on the following:
 - Safety or efficiency of a task
 - The cumulative tasks that make up a project
 - The cumulative projects that make up the annual workload of a company

Credible benchmarking depends on clear category definitions, explicit formulas for calculating metrics and some level of quality assurance that agreed processes are followed – everyone is comparing apples-to-apples.

In the world of competitive contracting, it is very important that productivity data for individual projects or companies cannot be “backed out” of the comparative medians and quartiles – the benchmarking database must be safeguarded by robust confidentiality processes.

Competitive benchmarking is defined as the continuous process of comparing practices and performance measures with the most successful competitors in the industry. It is notable, in this highly competitive sector, that safety benchmarking is public and transparent – the all-industry commitment to providing safe workplaces transcends individual competitive advantage.

Why is Benchmarking Important?

THAT WHICH GETS MEASURED, GETS DONE

One of the most captivating reasons we benchmark, is to ultimately become a better company. The process of benchmarking provides the ability for a company to improve products, services and strategies. Organizations which undertake benchmarking, in any field, are usually motivated by the quest for improved performance – they recognize “that which gets measured, gets done”. Benchmarking comparisons provide motivation for change, a factual basis for prioritizing what needs to improve and a measurement of progress toward the goal.

TANGIBLE GOALS, A COMMON LANGUAGE, AGREED MEASURES OF PROGRESS ...

At a strategic level, competitiveness depends not just on a single company, but on the entire supply chain. In the case of heavy industrial construction, owners cannot build major projects in isolation; they depend on engineers, contractors and suppliers working together with them to efficiently deliver projects. Benchmarking provides tangible goals (quantified), a common language to discuss improvement efforts (standard definitions) and agreed measures of progress (metrics).

What is the History of Benchmarking in Alberta?

COAA established a benchmarking database of industrial construction projects that has been in operation since 2006, allowing COAA members to assess the performance of their projects against projects in their industry. Project costs, schedule and safety data and engineering and construction information are input into the database at two specific times in the project life cycle, namely sanction (budget) and completion (actual). The COAA Performance Assessment System (PAS) utilizes the project data to calculate metrics that can be further analyzed to assess project performance and engineering and construction productivity.

To date, the data for Alberta projects has been analyzed twice for 2006-2009 ([Alberta Report I](#)) and 2010-2014 ([Alberta Report II](#)). These reports compare project performance and productivity numbers for different types of Alberta projects (e.g. Oil Sands SAGD and Pipeline), for projects in the two-time periods and also for major projects located in the United States.

To provide local support capability for Benchmarking Phase II, COAA worked with professors and students the Schulich School of Engineering (Civil Engineering) at the University of Calgary (UofC). The UofC team supports COAA members participating in the Benchmarking project, including database training, assisting with gathering project data and analyzing the benchmarking information. As of March 2014, the UofC has trained over 200 Benchmarking Associates (professionals from participating COAA members). The UofC team also conducts research into other benchmarking techniques that might be incorporated into the PAS to enhance its capabilities.

The Benchmarking Phase III project kicked off in 2016, with the goal of increasing the database from the current 60-70 completed projects, to over 100. This will greatly increase the utility of the database, as well as the strategic foundation which underpins development of the high-level productivity metric, the [Alberta Productivity Index](#). In addition to collecting detailed project metrics, Phase III will introduce the new “10-10 Benchmarking” methodology.

Developed by the CII, this approach facilitates qualitative assessment by the project team of 10 project management activities, which are correlated to 10 leading indicators of project performance. Development of this simplified, forward-looking, real-time project management tool builds on the foundation of the detailed COAA mega-project database, through which Alberta-specific correlations can be developed between leading indicators and lagging KPIs of completed projects.

What is Unique About Benchmarking in Alberta?

OPPORTUNITY & VISION COINCIDED TO ENABLE INDUSTRY-WIDE BENCHMARKING OF MEGA-PROJECTS.

Since the mid-2000s, Alberta has been a hot-spot of industrial development, with dozens of mega-projects being established by a wide variety of owners. Alberta also stands out as a highly collegial region, with many industry leaders being open to collaboration on certain issues, for the common good, e.g. freely sharing best practices for creating safe workplaces; addressing systemic productivity issues. Thus, there was both the opportunity (projects) and the shared vision (collegiality) to undertake industry-wide benchmarking of mega-projects.

How is Productivity Benchmarking Evolving?

BIG “P” PRODUCTIVITY -- LEADING INDICATORS -- ALBERTA PRODUCTIVITY INDEX

Three notable trends have emerged in recent years:

- Shifting emphasis from little “p” productivity (field placement rates) to big “P” productivity (effective project strategy, planning and management processes). Now explicitly recognized as foundational to success in the field, the front end of projects is receiving more management attention and more benchmarking measurement.
- To provide “real time” feedback for managing efficient project delivery, leading indicators of project productivity have been developed and are now being implemented to provide insight while a project is in progress: the CII 10-10 Program is the prime example. (Traditional benchmarking has been about gathering data on past tasks or projects - the concrete pour yesterday or the project completed last year – to garner insights applicable to future projects.)
- COAA has developed the Alberta Productivity Index, a high-level productivity metric which enables discussion of overall project productivity based on a balanced scorecard of 13 measures (including front-end planning and organization plus field placement rates).

What is the High-level Safety Metric for the Alberta Heavy Industrial Construction Sector?

TOTAL RECORDABLE INCIDENT RATE (TRIR)

After evolving from early metrics (e.g. Lost Time Incidents, LTI), the current metric is well defined, understood and accepted across the sector: Total Recordable Incident Rate (TRIR)

Incidents include:

- Fatality incidents (F)
- Lost time incidents (LT)
- Modified duty incidents (MD)
- Medical treatment incidents (MT)

The rate is number of incidents per 200,000 person-hours worked (i.e. approximately 100 person-years).

$$TRIR = \frac{F + LT + MD + MT}{\text{Person} \cdot \text{Hours}/200,000}$$

First aid incidents and near miss incidents are also tracked to provide the complete statistical picture. In companies and on projects, first aids and near missed are typically tracked and analyzed for lessons learned. Sector-wide statistics are analyzed through a partnership with ISNet Canada. Only aggregated statistics are reported to COAA: individual company confidentiality is respected.

What is the High-level Productivity Metric for the Alberta Heavy Industrial Construction Sector?

ALBERTA PRODUCTIVITY INDEX (API)

To date, there has not been an industry-standard metric for productivity of mega-projects. The COAA Industry Leaders Roundtable worked with CII to develop a balanced scorecard which included front end elements together with field elements. The methodology underlying the scorecard is well-established and industry-accepted approach used by CII in their field productivity measures. The data used to calculate the Alberta Productivity Index is available in the COAA Major Projects Database. Similarly, comparative metrics for US projects can be calculated from the CII database.

The API balanced scorecard elements include:

- Engineering work hours / productivity
- Engineering completeness / accuracy / timeliness
- Owner team FTEs
- Indirect work hours
- Scaffolding work hours
- Off-site module fabrication
- Concrete Field Productivity
- Structural Steel Field Productivity
- Electrical Field Productivity
- Piping Field Productivity
- Instrumentation Field Productivity
- Equipment Field Productivity
- Insulation Field Productivity

Each of the elements are normalized versus their respective North American statistical distributions (Canadian + US projects), then averaged to calculate the index on a scale of 0 to 100 (50 being the North American median).



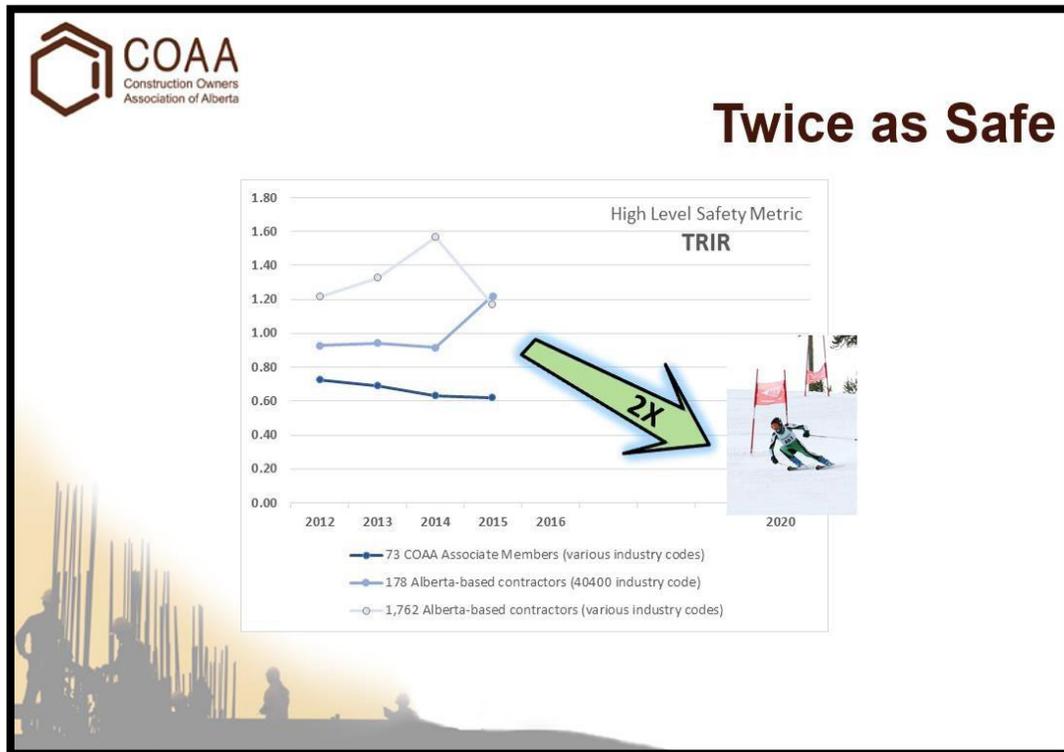
Twice as Safe, Twice as Productive by 2020 – What’s It All About?

THE “TWICE” VISION | THE “TWICE” TARGETS

Safety has always been the top priority for COAA. By 2014, the Board had wrestled for several years with how to move the Alberta heavy industrial construction sector to action to reverse the trend of declining productivity. After forming the Industry Leaders Roundtable – to draw together senior individuals from owners, engineers, contractors and labour providers – the epiphany came: better safety performance and better productivity performance are not competing goals, they are complimentary. The same project disciplines that created a positive safety environment also set the stage for positive productivity – and vice-versa. “Twice as Safe, Twice as Productive” was the vision that resonated across the industry, starting with a call to action from the president at the time, Premier David Hancock, at the COAA Best Practices Conference in 2014. Consistent with COAA’s benchmarking philosophy, the ambitious vision had to be translated to quantitative goals and measurable progress.

The high-level safety metric, TRIR, was well defined and accepted, however, no industry-wide data was readily available to quantify the industry baseline. COAA worked with ISNet, who queried their database of prequalification information provided by 178 unidentified Alberta contractors (including 73 COAA members) for 2012 to 2015. The baseline TRIR was deemed to be 0.80; therefore, “twice” as safe would be TRIR = 0.40.

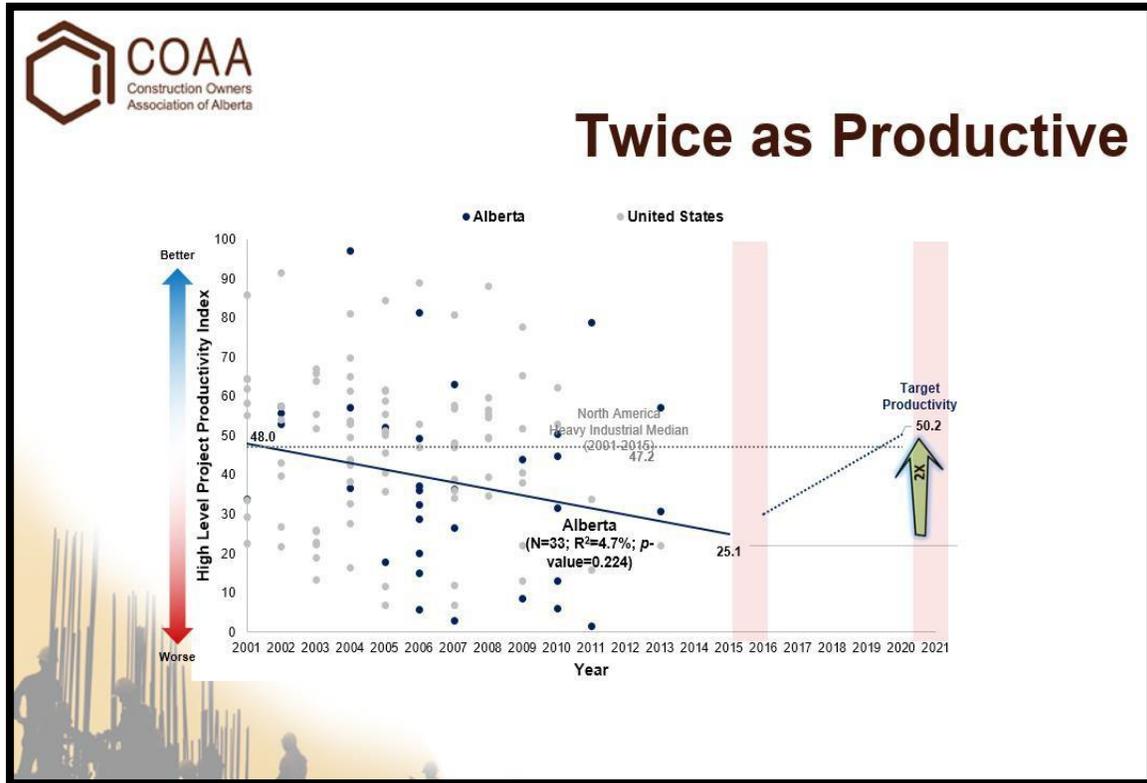
Note: The safety goal is always TRIR = 0.00 (everyone goes home safe at the end of the day): TRIR = 0.40 is a 2020 milestone along the path to the ultimate goal of zero.



In contrast, there was no industry-accepted high level productivity metric. Various owner companies and consultants adopted different key indicators which reflected elements of productivity of specific importance to them, but there was no widely-accepted key indicator; and in many cases, no standard category definitions or explicit formulas.

Starting from basic principles, the COAA Industry Leaders Roundtable conceptualized a high- level productivity metric which enables discussion of overall project productivity based on a balanced scorecard of 13 measures (including front-end planning and organization plus field placement rates). The methodology underlying the scorecard is well-established and industry- accepted approach used by Construction Industry Institute (CII) in their field productivity measures. The Alberta Productivity Index is based on a scale of 0 to 100, with 50 being the North American median during the period 2001 to 2011.

Analysis of the COAA major projects database shows a decline, from about 50 to 25 between 2001 and 2014 (i.e. from about the North American median to the lower quartile). The “twice “ goal is to double productivity of the industry as a whole, as reflected by 2014 – 2020 data coming into the database – to have projects reporting Productivity Indices around 50 by 2020.



What is COAA Doing to Improve Our Industry?

LEADERSHIP – ENGAGEMENT – BENCHMARKING – BEST PRACTICES

The COAA Board, together with the Industry Leaders Roundtable, moved to frame the apparently unfixable “productivity problem” as an issue which, first, urgently needed the attention of Alberta construction leaders and, second, as issue that could indeed be solved through commitment and cooperation. In classic COAA fashion, the call to action engaged everyone in the industry – owners, engineers, contractors and labour providers – Twice as Safe, Twice as Productive by 2020. Clear, well defined goals have been specified: TRIR ≤ 0.40 and API ≥ 50 by 2020.

As companies strive to “move the needle” on their safety and productivity performance, more than 30 best practices developed by COAA are available to assist them on their journey.

Additional COAA Benchmarking Resources

The following link provides a summary document (along with additional resources) describing the COAA projects around industrial project performance benchmarking. There are two final reports, Alberta Report 1 and Alberta Report 2, included in this link. These efforts have been conducted by the COAA Benchmarking committee.

<https://www.coaa.ab.ca/library/benchmarking-projects/>