MODULARIZATION & ECI

Dual Strategies to Reduce Risks in Building Large-scale Industrial Projects

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Dual Strategies to Reduce Risk in Building Large-Scale Industrial Projects

MODULARIZATION & ECI

Dual Strategies to Reduce Risk in Building Large-scale Industrial Projects

WHAT THIS EBOOK WILL HELP YOU UNDERSTAND

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This eBook will introduce the benefits of modularization in designing large-scale industrial projects. By shifting part of the build process off-site into a controlled facility environment, project owners can increase opportunities to reduce risk, lead times, and total installed costs.

This eBook will also explain how integrating the process of Early Contractor Involvement (ECI) can improve the industry standard of project management and, ultimately, break down the barriers to effective communication between stakeholders for more successful project results.

Lastly, this eBook will present two case studies of large-scale fabrication projects. These will describe real-world success stories that were achieved by combining a dual-strategy approach - using modularized fabrication with varying degrees of the collaborative ECI process.

INTRODUCTION

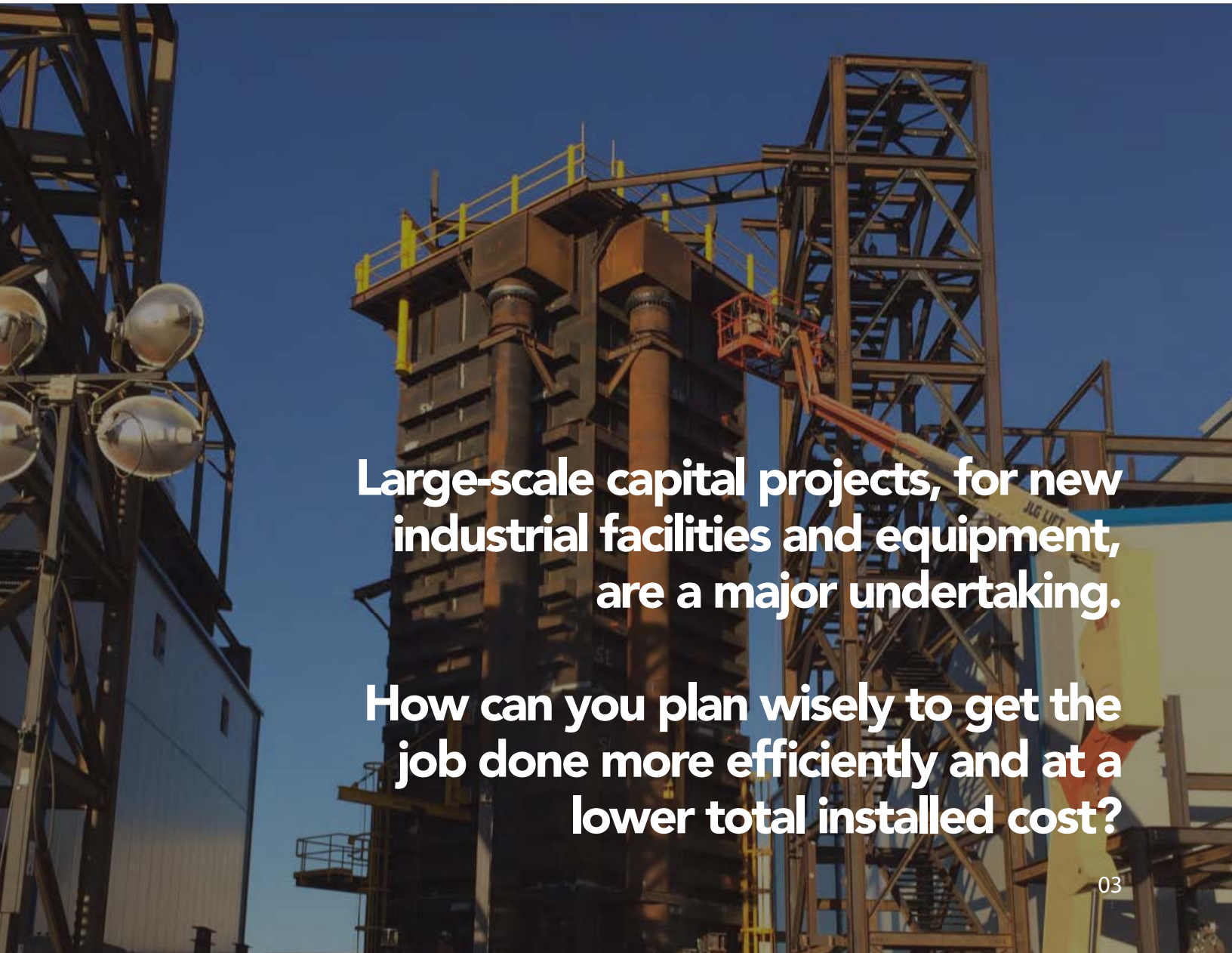
CHALLENGES IN LARGE-SCALE INDUSTRIAL PROJECTS

Large-scale capital projects, for new industrial facilities and equipment, are major undertakings. They require long lead times, multiple stakeholders, and a variety of complex processes that must come together in sequence or simultaneously.

In the end, however, the primary goal is the same as for any project: to build a quality end-product on time, safely, and within budget.

With so much at stake in these megaprojects - that are often also in remote locations and logistically challenging - careful planning is essential. What does it take to prevent delays, incidents, and costly overruns?

Better yet, how can you plan wisely to get the job done more efficiently and at a lower total installed cost?



Large-scale capital projects, for new industrial facilities and equipment, are a major undertaking.

How can you plan wisely to get the job done more efficiently and at a lower total installed cost?

SECTION 1

Shifting a significant portion of the build process into an off-site controlled environment improves scheduling, safety, and the bottom line.

INTRODUCING MODULARIZATION: BENEFITS FOR COMPLETING LARGE-SCALE INDUSTRIAL PROJECTS

To help improve the outcome of large-scale and more complex projects, modularization is an increasingly smarter strategy. Modularization gives teams more certainty to design for efficiency, and to anticipate each step in the build process, by eliminating some of the less controllable conditions associated with on-site, outdoor construction.

Modular fabrication for industrial facilities refers to the process of building large components of equipment and facility structures off-site - in sections or modules - for final assembly and/or installation on-site.

Key benefits of modular fabrication strategies

The primary benefits of modularization strategies (also referred to as pre-fabrication, pre-assembly, or MOC/Modular and Off-site Construction) include:

- Improved safety for workers
- Improved quality of built components
- Improved scheduling - in certainty and acceleration
- Reduced use of labor and materials
- Reduced total installed costs

Shifting a significant portion of the build process into a fabrication facility - within a controlled indoor environment - has many obvious advantages, such as avoiding issues due to weather, available workforce, and safety.

Modular fabrication provides the ability to integrate more building elements and to create more dense components.

Additional advantages of a modular approach

Other advantages of modularization - or off-site modular fabrication - for completing large-scale projects include:

- ability to build multiple modules simultaneously - then ship to site as needed
- completion of pre-assembly of more intricate elements, such as electrical wiring or piping
- reduced rental costs - such as for cranes, site support equipment, worker facilities
- reduced staging costs
- reduced area required for lay down

Pre-fabricated components for industrial projects are built primarily of large steel or specialty alloy components. Completed sections can be pre-assembled and pre-commissioned to integrate more building elements and create more dense components - to reduce the amount, and difficulty, of the final construction required on-site.

Multiple components can better coordinate and speed up scheduling

The off-site fabrication of just one major component can help to speed up total construction times on location. With more pre-fabricated modules planned, the timing of several components could further improve scheduling and help with project logistics.

By contracting one or several large fabrication facilities, multiple project sections or modules could be built off-site simultaneously, or in sequence, then shipped to the site for 'just-in-time' installation. Meanwhile, other construction work could be completed or prepared on location - such as foundations or site infrastructure.

Pre-test fitting for 'plug and play' precision on-site

The custom fabricated modules are designed to fit together easily and precisely when they arrive on location - like Lego blocks - and can be constructed in many configurations and formats - to be placed side-by-side or stacked in multiple levels.

Test-fitting - a process completed at the off-site facility, before shipping - enables a fabricator to check how the modular components will fit when finally assembled on-site. This contributes dramatically to preventing unexpected issues, improving quality, and reducing the entire construction time on location.

Test-fit during winter conditions

Modules are fabricated and assembled indoors, then pre-tested outside the fabrication facility to ensure a smooth installation when delivered on-site.

Precision design of modular components requires anticipating many factors

The precision designed into the fabricated modules for large-scale projects requires anticipating many factors, such as:

- conditions on-site during the construction period
- availability of needed trades and technical workforce for completing work on-site
- logistics for the on-time delivery on-site of other project components
- extended conditions at the facility's location that will affect later operations and maintenance

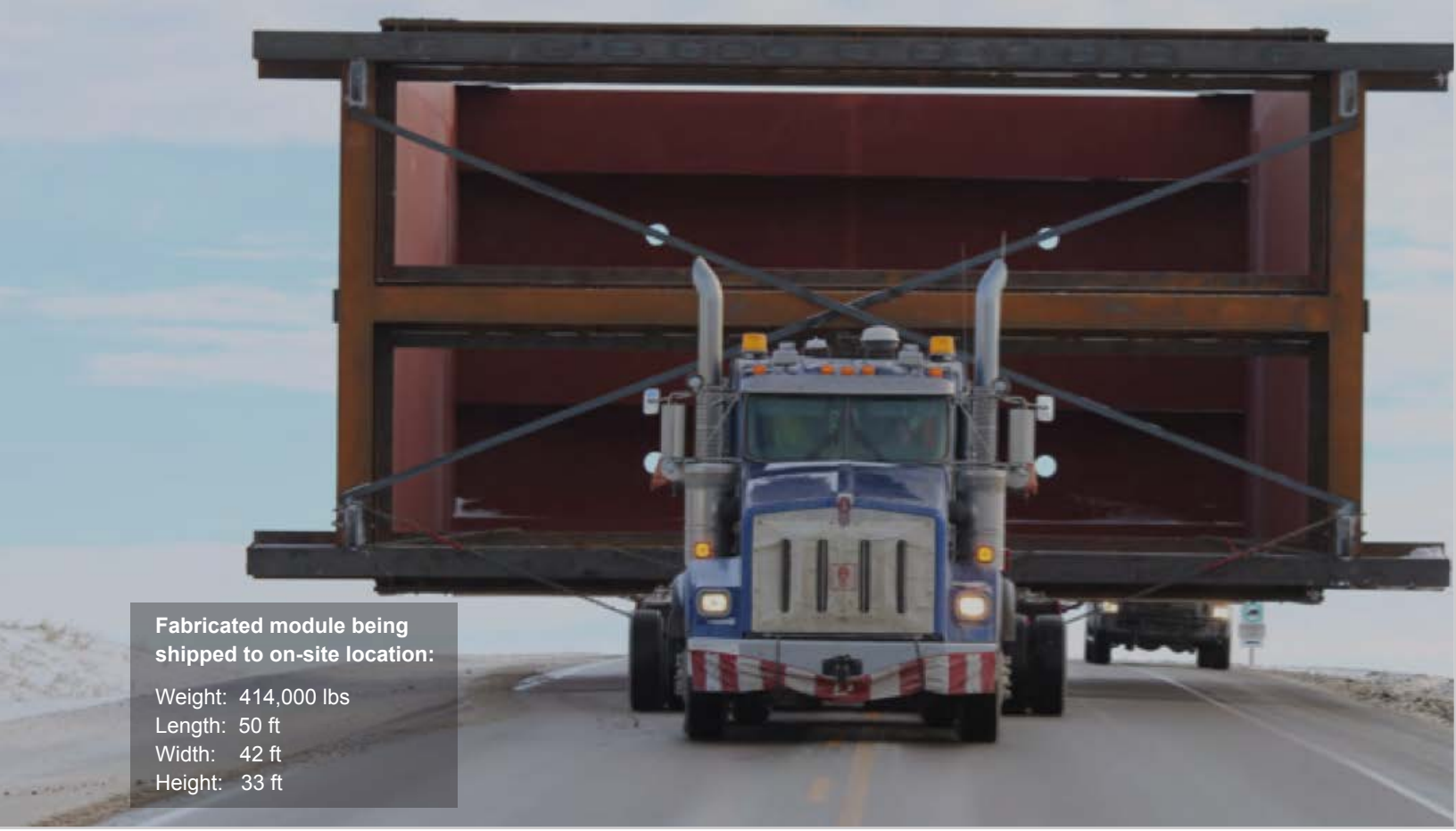
Details of the transportation or shipping process - how the finished modules will get to the site location - also need to be anticipated in the design. Total dimensions need to fit over roadways or under power lines, and the components have to be robust enough to withstand the journey. Additionally, access roads to final laydown locations must be ready to sustain the extreme weight of the modules and trucks.

For facilities at remote locations or in harsh environments: some additional benefits of modularization

Fewer Safety Concerns

On-site work generally involves higher risk and safety issues than work in more controlled and consistent environments. For organizations that promote safety and aim for 'zero incidents' among workers, modular off-site fabrication supports the priority to improve safety.

For remote industrial facilities being built on-site, weather can greatly affect safety. In the more northern regions of North America, cold temperature and frozen ground make for extremely difficult working conditions. Ice and snow can increase danger for workers, even when just walking around a site. By moving work off-site into a fabrication facility, many of safety risks associated with inclement weather are eliminated, especially during the winter months.



Fabricated module being shipped to on-site location:

Weight: 414,000 lbs
Length: 50 ft
Width: 42 ft
Height: 33 ft

Better productivity and reduced construction times

In addition to the safety issues related to cold weather, harsh climates - combined with unfamiliar work environments - create conditions in which it is difficult to be highly productive. The pace of work on-site becomes less predictable and is generally slower.

During construction on location, temporary crews often work under new supervision and need to handle different equipment in challenging surroundings. If the project is at a very remote site, long periods living away from home add to an unfamiliar daily rhythm. All of these conditions diminish a project's overall productivity, increasing the time needed to complete work.

By contrast, many of these issues can be mitigated, or even eliminated, when work is completed off-site in an established fabrication facility. Within the controlled conditions that such a facility provides, the pace of work is more predictable and target completion dates are easier to meet.

Overall, good planning and coordination of both off-site and on-site construction processes - leveraging as much modularization as possible - can help to complete large-scale project in tough environments more safely and at a steadier, faster pace all year-round.

Modular fabrication is a newer strategy for complex, and more remote, industrial facilities

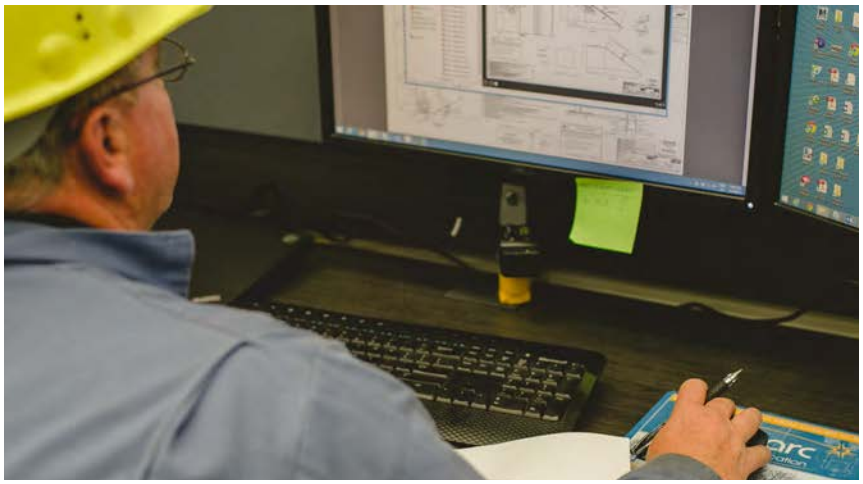
DESIGNING FOR MODULARIZATION

While modularization and pre-fabrication processes have been used for centuries in the building construction industry, it is a newer strategy for building large-scale industrial facilities.

Why? These projects tend to be less standardized - with components that must be customized for very specific uses, structural sizes, and environments - making modularization more challenging to coordinate.

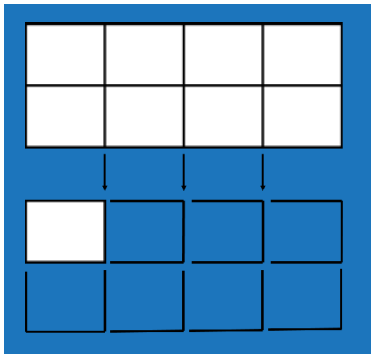
The scale of industrial projects also adds to the complexity - requiring the integration of extremely large modules and management of much longer design/build timeframes.

Nevertheless, more industrial facilities are now taking advantage of modularization and pre-assembly. At least some components, if not most of a planned facilities project, can be built off-site and benefit from modular strategies.

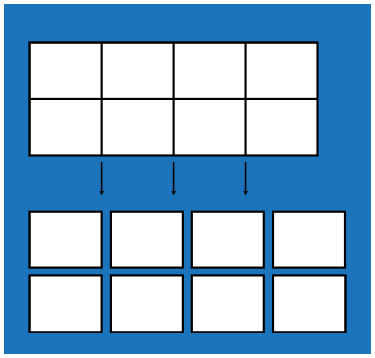


Is it possible to plan for modular components after a project has started?

Even if an industrial project is already underway, it can benefit from modularization and still have some components built off-site. Existing design drawings and plans can be reviewed to



NON-MODULAR DESIGN: module does not break apart into solid independent components



MODULAR DESIGN: module breaks apart into solid individual components

find options for improving the build process and schedule through off-site fabrication and pre-assembly.

Of course, integrating modular fabrication late in the design/build process will usually involve incurring additional costs. A project designed for on-site construction cannot simply be reverse-engineered, piece-by-piece, to then build sections as modular components. A project - or a specific section of a facility - must be redesigned for a modular build to create worthwhile efficiencies, as well as to confirm that the modular components are suitable for transportation and a quick installation on-site.

Why the earliest planning for modularization is most efficient

Projects that are originally designed for on-site building are more difficult to adjust for integrating into modular components - although not impossible.

Redesigning for modularization is more involved than just simply breaking apart existing stick-built designs for pre-fabrication. Some sections will require extra members or material supports to be structurally independent. The extra material enables each separate component to be deconstructed/re-assembled for testing and to withstand shipping and final installation process on-site.

In the end, however, in spite of requiring redesign and (slightly) more material than for on-site construction, modularization adds minimal costs when compared to the overall benefits: reduced risk, improved ability to meet tighter deadlines, and potentially overall project cost savings.

This module was designed with supports for transportation. The darker steel will be removed prior to installation on-site.

CASE STUDY

New Headframe at a Mining Facility: Lesson Learned in Planning Ahead

OWNER:
NUTRIEN (FORMERLY POTASHCORP)

LOCATION:
SASKATCHEWAN, CANADA

CHALLENGE

The owner of a mining operation in Saskatchewan, Canada, was expanding an existing facility and required a new large-scale headframe for the project.

On-site construction was planned during the cold winter months.

STRATEGIES

Nutrien (formerly PotashCorp) had set an original procurement strategy of erecting the headframe on-site as a stick-steel structure. Initial design parameters involved assembling the headframe on location in five 50-foot tall modules and one 29-foot tall module, to be lifted into place with a strand jack system.

As the traditional procurement process unfolded, Saskarc was invited to price the fabrication after the design was already completed. A contract was established with Saskarc to perform connection design, detailing, supply, fabrication, and painting of the structural steel and plate work.

After review of the existing design, the team at Saskarc proposed a modular approach to complete the entire headframe project more efficiently and with less risk, especially under harsh winter conditions. The strategy that was recommended involved pre-assembling the steel frame off-site into eleven modular sections and shipping these larger components to the site for faster installation.

Although the owner was willing to consider the proposal, Saskarc was asked to provide a quote for both strategies – the on-site stick build and off-site modularized options - so that the two bids could be compared.

Following a review of the options, the owner did select the modular approach. The advantages of off-site modular fabrication would include reduced on-site work, lower total installed costs (TIC), and help in keeping the project on schedule by avoiding weather delays.

RESULTS

Saskarc worked closely with the engineer to redesign the build, adjusting the column splice locations of the modules to meet height restrictions set by the power lines during transportation. When they arrived on location, the headframe components went together like Lego blocks in only a few weeks, instead of the months that had originally been expected.

The project owner was extremely impressed with the end results of using a modular fabrication strategy.

Ultimately, it was a lesson learned for the owner. Had a contractor/fabricator, such as Saskarc, been involved earlier in the design process, a modularized design could have been developed from the start. This would have eliminated any redesign cost and schedule impact, and possibly would have uncovered a more efficient solution.

In the design/build industries, good communication is often a challenge - among the owner/customer, engineer/designer, and fabricator/ contractor.

INTRODUCING ECI: EARLY CONTRACTOR INVOLVEMENT

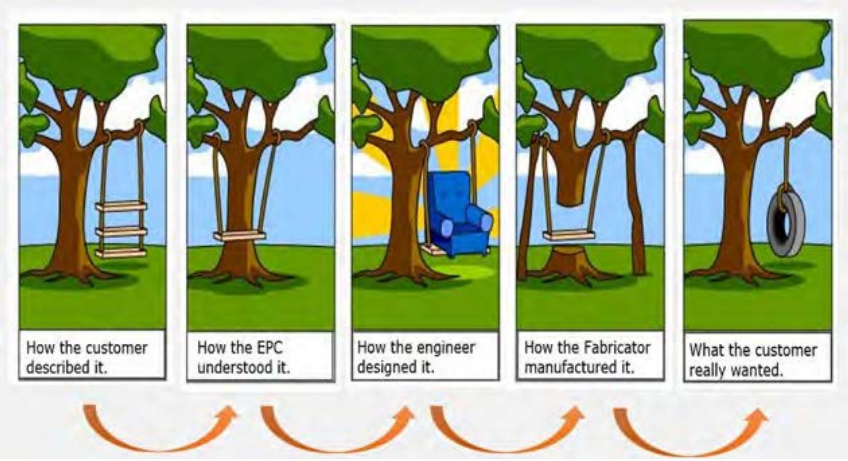
The value of a more integrated design/build process: how communication impacts project success

It's not unusual for large-scale construction projects to experience schedule delays and/or cost overruns. But why?

While increased project costs might be attributed to on-site conditions or unexpected requirements, the true causes are often due to poor communications between the parties involved. And the larger the project, the more ineffective communication becomes a factor in added time and costs.

What is ineffective communication in the traditional design/build process?

In the design/build industries, good communication is often a challenge among the owner/customer, engineer/designer, and fabricator/contractor. The cartoon strip, below, depicts this common reality.



This variation of the 'tree swing' example shows how information can be misinterpreted during the different phases of design. When communication between key stakeholders is limited, project optimization is compromised, and there is an increased risk of cost overruns and schedule delays.

From a linear design process to a more integrated set of ideas

Ineffective communication exists in many design/build projects because the traditional process of planning tends to be linear – each team working independently, then communicating only when ready to transfer the project on to the next phase. This creates a disconnect in developing the project goals when, instead, a continuous interchange of ideas - to discuss and plan strategies - would help guide the process to a more successful completion.

The lack of effective communication can cause a ripple effect of problems - compounding costly design and procurement decisions. Good communication, on the other hand, helps the different teams strategize together - to plan early and prevent problems in the first place.

Large and complex industrial projects need a more dynamic communications process – with all stakeholders contributing throughout the project.

When considering a modular approach to build these complex projects, effective communication will greatly impact the final success. Modularization improves outcomes, but better communication at every stage can increase the benefits.

We'll discuss how Early Contractor Involvement – or ECI – works to better integrate all professional input from the start, from project concept and design, to procurement and construction strategies.

Leveraging insights from multiple perspectives for better project planning

As described above, challenges in the traditional design/build process often stem from a lack of good communications. Yet, new projects need to be planned through various professions, contractors, and ownership relationships, each having a unique perspective and area of expertise for accomplishing the project goals. How these partners communicate and collaborate through the different phases of design, procurement, and construction will have a great effect on the final success of a project.

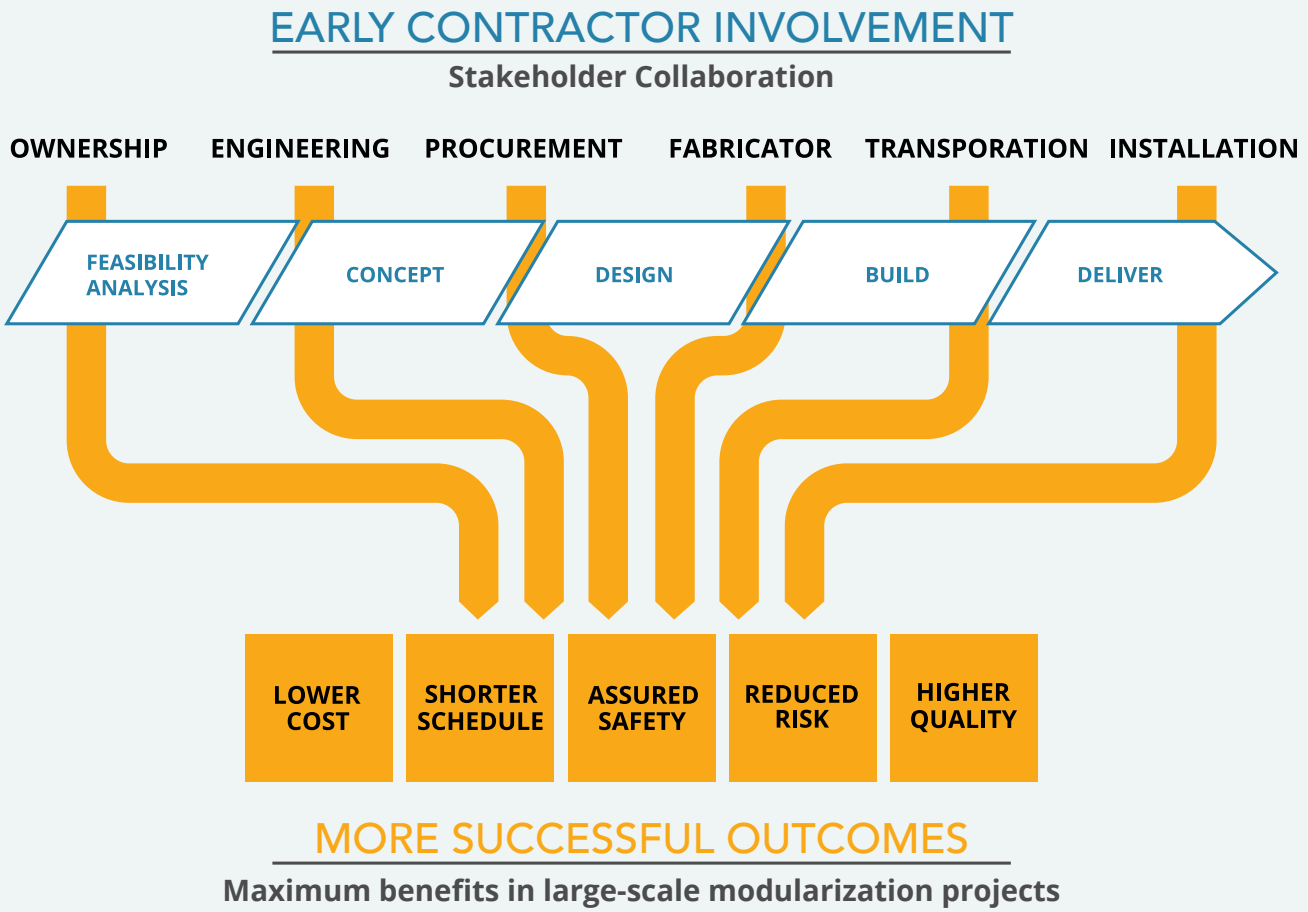
In managing a large-scale construction project through modularization - a highly complex and technical undertaking - any communication problem within the design/build process will eventually be magnified, as will any negative impacts of poor decisions on the final project outcomes.

Better to plan on getting communications right, right from the start.

ECI - A paradigm shift to improve communications in the planning of large capital projects

Effective communication takes advantage of those different perspectives and experiences of all parties involved to plan a more integrated strategy. Early Contractor Involvement, or ECI, essentially leverages this idea of effective communication and collaboration to improve a project's design and management.

For success in planning large-scale capital projects that will leverage the use of modular off-site fabrication, early collaboration guarantees the best outcomes. The following diagram illustrates how partner dialogue and joint planning - from the beginning and throughout the project life cycle - can create maximum benefit for the entire project.



Encourage participation by helping partners understand the benefits of early involvement

Because design/build efforts often get trapped in distinct silos of responsibility, encouraging stakeholders to collaborate will be easier if everyone understands the benefits of an early and continual communications process.

The benefits should be obvious. Each partner can offer a wealth of insights from past projects, as well as ideas for innovative approaches, to develop a better program. Setting a challenge to collectively find the most efficient strategies - to save time, risks and costs - can help everyone envision that, in the end, a successful project is the result of input from all involved. Project success should not be left to chance.

Input from a greater variety of stakeholders can inform better decisions

ECI for large-scale projects should also gather insights from extended teams in the process to construct and operate an industrial facility. From freight specialists and labor coordinators to facilities and maintenance managers, every stakeholder can provide important details to inform better decisions in early project planning.

SECTION 4

Choosing the right path:

How to implement Early Contractor Involvement, or ECI, for large-scale modular fabrication projects

ECI BEST PRACTICES FOR LARGE-SCALE MODULARIZATION PROJECTS

Involving a fabrication contractor in early planning helps to assess the benefits of modularization

Project planning for any large-scale industrial project begins early and generally includes a set of the key stakeholders that will be involved.

For these large projects that may include a significant use of modularization, involving a modular fabrication contractor from the start is important in helping to assess the potential benefits.

The challenge is deciding how and when to bring the contractor into the process.

First, information is needed to assess if modular fabrication makes sense for a particular project. And if it does, then a fabrication contractor must be selected.

One practical approach – to gather the important information required for decision making - is to complete a *Project Feasibility Analysis* to assess the potential use of modularization. Feasibility assessments – either preliminary or more in-depth – are a good way to understand the advantages of an unfamilar modular strategy for building industrial projects.

Project owner options to benefit from Early Contractor Involvement

A *Project Feasibility Analysis* helps to understand the scope, major challenges and potential design approaches that relate to a specific project considering modularization. After an analysis is completed, the project owner and/or the EPCM can then consider one of three paths for implementing ECI and engaging with the modular fabricator.

THREE PATHS TO IMPLEMENTING EARLY CONTRACTOR INVOLVEMENT

	PATH 1 TRADITIONAL PROJECT MANAGEMENT	PATH 2 PREFERRED FABRICATOR	PATH 3 MANAGED ECI
WHY?	A familiar strategy	High confidence in a company and design approach	Evaluate multiple design approaches and vendors
ECI MANAGEMENT	Informal ECI process	Formal ECI process	Dedicated ECI management
COST MANAGEMENT	Formal tender	Transparent pricing model	Formal tender
PROS	Less complicated; good for smaller projects	Optimized Modularization/ECI; more streamlined schedule	Optimized Modularization/ECI; competitive bidding process
CONS	Value of Modularization/ECI not fully optimized	Less competitive bidding process for vendors	Additional time for the bidding process

PATH #1 - TRADITIONAL PROJECT MANAGEMENT

The Traditional Project Management strategy is often chosen simply because of its familiarity to all of the parties involved. Early Contractor Involvement best practices can be followed informally throughout the project - assuming all parties understand its principles, processes and benefits.

A formal tender process is used to source competitive bids for the final modular fabrication contract.

This approach represents the status quo for many industrial projects and is particularly useful for smaller and less complicated initiatives. However, for large and complex projects, the full value of modularization and ECI would not be optimized – especially since the informal process of early planning would not lead to the best solutions. There may be compromises in efficiencies, safety and quality that could cause schedule delays and/or an increase to total installed cost.

PATH #2 – SELECTING A PREFERRED FABRICATOR

The process of selecting a Preferred Fabricator is a modern alternative to the traditional approach.

Under this scenario, a preferred fabrication contractor may emerge from the *Project Feasibility Analysis* if a design approach is identified that offers overwhelming benefits to the project from a known company with a proven track record.

The Preferred Fabricator would be responsible for managing a highly formal process to facilitate ECI best practices. Because selecting a preferred contractor bypasses the traditional competitive bidding process, a transparent pricing model would need to be established to ensure a competitive cost.

The advantage of this approach is the ability to optimize the benefits of modularization and ECI, while avoiding a lengthy bidding process and streamlining the overall project schedule. However, it precludes a traditional competitive bidding process that could produce lower cost alternatives.

PATH #3 – MANAGED ECI

Managed ECI is a variation of Path #2. This path is most appropriate when the results of the *Project Feasibility Analysis* points to multiple potential design options and no preferred fabrication partner is identified.

In this case, there would be a formal bidding process, as in Path #1 or Traditional Project Management. However, ECI management would be identified as a separate line item in the bid package to recognize the value of Early Contractor Involvement to the project and to ensure this service is properly priced and proposed by vendors in their responses.

As in path #2, the Managed ECI approach ensures that the full benefits of modularization and ECI are brought to the project. And it does so in a way that maintains the competitive bidding process. However, the schedule will require additional time to accommodate the bidding process.

CHOOSING THE RIGHT PATH

Each of these three paths to implementing Early Contractor Involvement has different trade-offs and benefits. Choosing the right path is critical for maximizing the success of a modularization project, and selecting the best strategies will come from conducting a proper *Project Feasibility Analysis.*

CASE STUDY

ECI Strategy and Modularization Create Success at Mosaic's K3 Mine Expansion Project

OWNER:
THE MOSAIC COMPANY

LOCATION:
ESTERHAZY, SASKATCHEWAN, CANADA

CHALLENGE

For this major mining expansion project, innovative strategies were sought to optimize the entire build process. The large financial investment created a strong incentive for finding ways to reduce total installed costs (TIC), as well as to improve quality, safety, and the scheduled timeframe.

The new shaft and headframe steel would be primary components of the mine. Saskarc was challenged to help the project owner, and their engineering consultant, determine the business value of a modular approach and, subsequently, to manage the highly efficient final design and fabrication process.

STRATEGIES

In the early stages of planning for the Mosaic Company's Esterhazy K3 mining project, Saskarc was invited by Hatch, the owner's engineering representative, to present the advantages of modular off-site fabrication for the new shaft and headframe. Hatch facilitated this process of Early Contractor Involvement (ECI), which allowed Saskarc to recommend a winning solution to the owner from the start.

As a result of this meeting, Mosaic and Hatch decided to embark on a modularization approach for building the North shaft and headframe steel structure. The scope of the project would include 1,000 tons of structural steel and platework: 500 tons for the large modules to create an above-ground headframe, and another 500 tons for the pre-assembled units (PAUs) installed down the shaft.

The overall project strategy phases for the K3 Mine headframe would involve:

- Design and constructability planning
- Completion of the Request For Proposal (RFP) package for competitive bidding
- Fabrication and modularization of the structural and platework modules
- Transportation and installation

To complete the first phase, Hatch engaged Saskarc to provide technical assessment and expertise for the design and constructability planning. This early involvement by Saskarc – applying ECI strategies – would prove to help avoid both added time and cost to the final project.

During the initial design phase, Saskarc provided consultation and analysis through emails, design drawings, conference calls and online meetings. As the plan was further developed, Hatch, on behalf of Mosaic, contracted one of Saskarc's technical experts to spend three months at their engineer's office to review and provide input on the design, schedule and execution plan. This more detailed input provided the project owner with a highly-experienced perspective related to the fabrication, off-site modularization, transportation and installation processes.

Upon completion of the planning phase, the RFQ package was prepared and issued to the market for competitive bid. Saskarc, together with their partners, Procon and Waiward, also participated in the bidding process. The submittal put forward was competitive, and it provided a solid execution plan, with professionally presented details of the proposed process.

In the end, Saskarc was successful in winning the contract. Ultimately, the Saskarc team was responsible for the materials supply, fabrication, coatings, modularization, and delivery and installation of all the large modules (both platework and structural) for the new headframe at the K3 Mine site.

The completed modules for the Mosaic project were very large - up to 29 feet tall x 23 feet wide x 61 feet long - and weighing up to 90 tons. An important part in the project scope involved the test-fit of the modules off-site before delivery. This would confirm that all the fabricated components fit together as designed – and that the process could be repeated, with no fit-up issues on site during installation.

RESULTS

The final shaft and headframe modular fabrication project for the Mosaic K3 Mine expansion site in Esterhazy was completed as planned. Saskarc maintained the highest level of quality and safety, met the construction schedule, and lowered the project owner's total installed costs.

Saskarc's dedicated approach to working as a team from start to finish - with the owner (Mosaic), their engineering consultant (Hatch), and partners Procon and Waiward - ensured the most efficient and successful completion of this large industrial project.

Mosaic was highly pleased with the results of Saskarc's services in all phases of this project.

"We highly recommend Saskarc for providing their expertise through early contractor involvement, modularization input, as well as for metal fabrication and modularization projects of any large-scale project."

SECTION 5

A team familiar with collaboration for successful large-scale modularization projects

WORKING WITH SASKARC: MODULARIZATION AND EARLY CONTRACTOR INVOLVEMENT

At Saskarc, we believe in a thorough discovery process to gather information. To that end, open communications early in a project's development lets us ask the right questions and offer our perspective and expertise as an experienced fabricator of industrial modular components.

We understand how our involvement in the beginning stages of a large-scale capital project contributes to better collaboration, cost-savings, and overall success.

Saskarc can begin working with project owners early, to help assess the use of modularization strategies within the scope of large projects. When given an opportunity to examine feasibility from the start, our expert evaluations often uncover substantial savings to improve the return-on-investment for our customers.

When a modularized approach is selected, Saskarc completes the fabrication process with careful input through Early Contractor Involvement practices – to gather the right information needed to meet critical requirements. We focus on becoming a valuable extension of each customer's team – dedicated to completing your projects faster, more safely, and with a lower total installed cost.

OPTIONS FOR ENGAGING SASKARC EARLY IN PLANNING FOR MODULARIZATION

To help jump-start a process for assessing the feasibility of a modular approach in your next project, Saskarc offers the following two levels of services:

Preliminary Feasibility Analysis

A no-cost overview of the project scope to identify key issues and provide an initial assessment

Comprehensive Feasibility Analysis

Contracted in-depth review of project details and specific issues to provide formal recommendations

Preliminary Feasibility Analysis for Modularization

DESCRIPTION

During a Preliminary Feasibility Analysis, Saskarc reviews the potential for using a modular fabrication approach. Our technical experts provide an initial assessment of expected safety, construction quality, schedule, and total installed costs.

The goal is to identify important key issues and to understand how modularization could affect a project's optimization and overall success.

SERVICES

- No-cost engagement, conducted with key stakeholders
- Assessment of design and constructability considerations
- Identification of key issues associated with modularization for:
  - Fabrication
  - Transportation
  - Installation
- Modularization design best practices and recommendations
- Engagement duration of 2 to 4 weeks (via phone and digital communications)

CRITERIA FOR MODULAR FABRICATION

- Project size
- Project location
- Green field or brown field
- Project scope
- Timeframe

SERVICE OUTCOMES

- Feasibility of designing for modularization and pre-assembly
- Preliminary route study and shipping restrictions
- Preliminary design input
- Potential material alternates
- Schedule and installation sequencing

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Comprehensive Feasibility Analysis for Modularization

DESCRIPTION

Comprehensive Feasibility Analysis involves a more thorough review of the existing project scope and a more detailed assessment of expected safety, construction quality, schedule, and total installed costs.

Additional issues – such as specific project elements, stakeholder capabilities, and on-site conditions - are reviewed to deliver formal recommendations for developing a more successful project through modularization.

SERVICES

- Cost-based engagement, conducted with key stakeholders
- Assessment of design and constructability considerations
- Detailed feasibility analysis of key issues associated with modularization for:
  - Fabrication
  - Transportation
  - Installation
- Formal documentation of best practices and recommendations
- Engagement duration of 2 to 4 months (may include travel to customer locations)

CRITERIA FOR MODULAR FABRICATION

- Project size
- Project location
- Green field or brown field
- Project scope
- Timeframe

SERVICE OUTCOMES

- Feasibility of designing for modularization/pre-assembly
- Preliminary route study and shipping restrictions
- Detailed design input
- Potential material alternates

Review and/or development of planning documents to support the execution of an optimized final project, including:

- Work packages
- Construction schedule
- Installation sequencing
- Safety plans
- Timeframe

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Let us take your project from concept to reality.
We look forward to working with you.

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