



Darlington New Nuclear Project (DNNP)

BWRX-300 Update



AECOM

Greg Thede
VP Nuclear Strategy, Business Development & Services

6th Annual Conference
February 5, 2025

364

The image features three large, stylized numbers (3, 6, and 4) arranged horizontally. Each number is filled with a different nature photograph. The number '3' contains a photo of a blue lake and green hills. The number '6' contains a photo of a dirt road winding through a dense green forest. The number '4' contains a photo of a dirt road winding through a green field with trees in the background. The numbers are outlined in black and set against a plain white background.

ONTARIO **POWER**
GENERATION





Kalev Kallemets • 1st
 CEO at Fermi Energia
 8mo • Edited • 🌐

Thankful to OPG, GE Hitachi, Aecon and Atkins Realis for leading SMR deployment in the Western world with BWRX-300 in Darlington, Ontario. Site preparation continues to progress and investment into licensing, design completion, and supply chain is the basis for deployment of the BWRX-300 project developments in Europe, including for Fermi Energia in Estonia. All European utilities and developers aiming to have realistic near-term SMR deployments, need to come to Canada, Ontario to experience real progress and execution excellence.

Greg Thede from Aecon was able to arrange a site tour of the great progress being made. #Aecon #OPG #GEHitachi #SMR



👍👍👍 210

7 comments • 9 reposts

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Kalev Kallemets • 1st
 CEO at Fermi Energia
 8mo • Edited • 🌐

55 Members of Parliament (101 total MPs) submitted draft decision of Parliament mandating Estonia to preparations for nuclear energy utilization. Vote likely in few weeks.

Greetings from Darlington NPP site where site preparation construction of BWRX-300 by Aecon is underway on schedule.

<https://lnkd.in/dixFKtBu>



👍👍👍 129

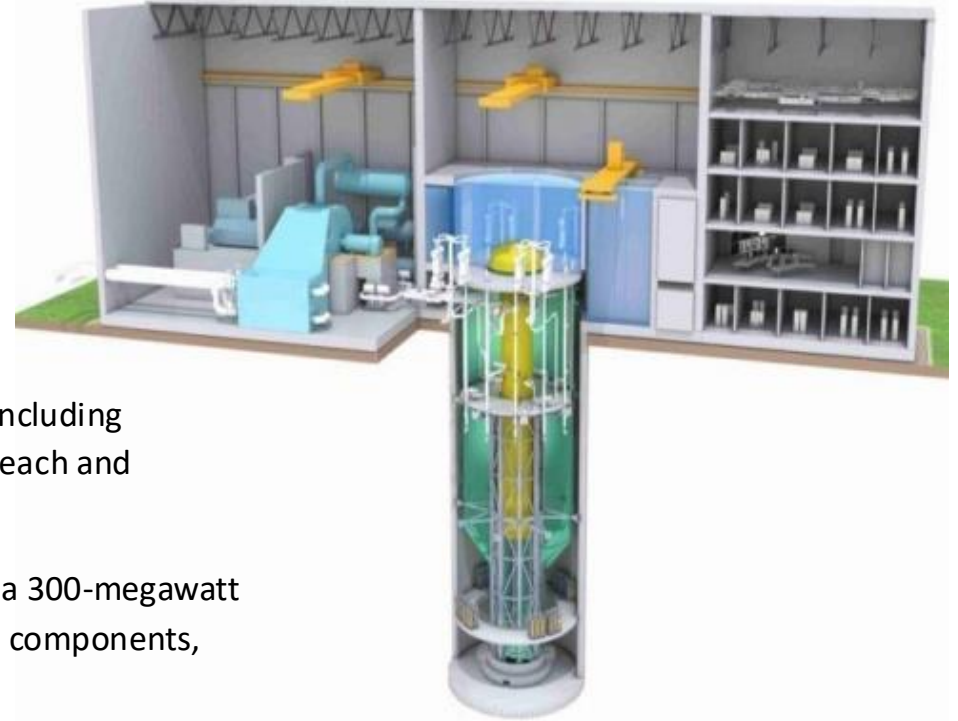
3 comments • 3 reposts

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SMR Darlington New Nuclear Project (DNNP)

Partnership to deliver first grid-scale Small Modular Reactor in North America.

Aecon, GE Hitachi and Atkins Realis entered into a long-term alliance agreement with Ontario Power Generation (OPG) under an **Integrated Project Delivery (IPD)** model whereby:



OPG will serve as license holder and maintain overall project responsibility, including operator training, commissioning, Indigenous engagement, stakeholder outreach and oversight



GE-Hitachi will be the technology developer and design authority delivering a 300-megawatt BWRX-300 reactor, and will be responsible for design, procurement of major components, engineering, and support.



Atkins Realis will serve as architect engineer, providing design, engineering, and procurement support



Aecon will lead all construction services and fabrication, including project management, procurement, modular fabrication, construction planning, and execution

Hydroelectric
Aggregates
Site Preparation & Foundations
Tunneling
Roads & Asphalt

AECON Civil



Nuclear Management Systems
Nuclear Quality Assurance Program
Fabrications and Modular Systems
New Build, Refurbishment, Maintenance
Decommissioning Expertise & Waste Management

AECON Nuclear



AECON Utilities



Power Distribution
Fiber Optic
Water Distribution & Sewer Collection Systems
Gas Pipeline Systems
Telecommunication Infrastructure

AECON Industrial



Cogeneration Energy
Renewable Energy
Natural Gas Distribution Systems
Oil and Gas
Water Treatment Systems
Shop & Field Fabrication & Module Solutions

One AECON

approach to enable successful BWRX-300
FOAK and NOAK deployment

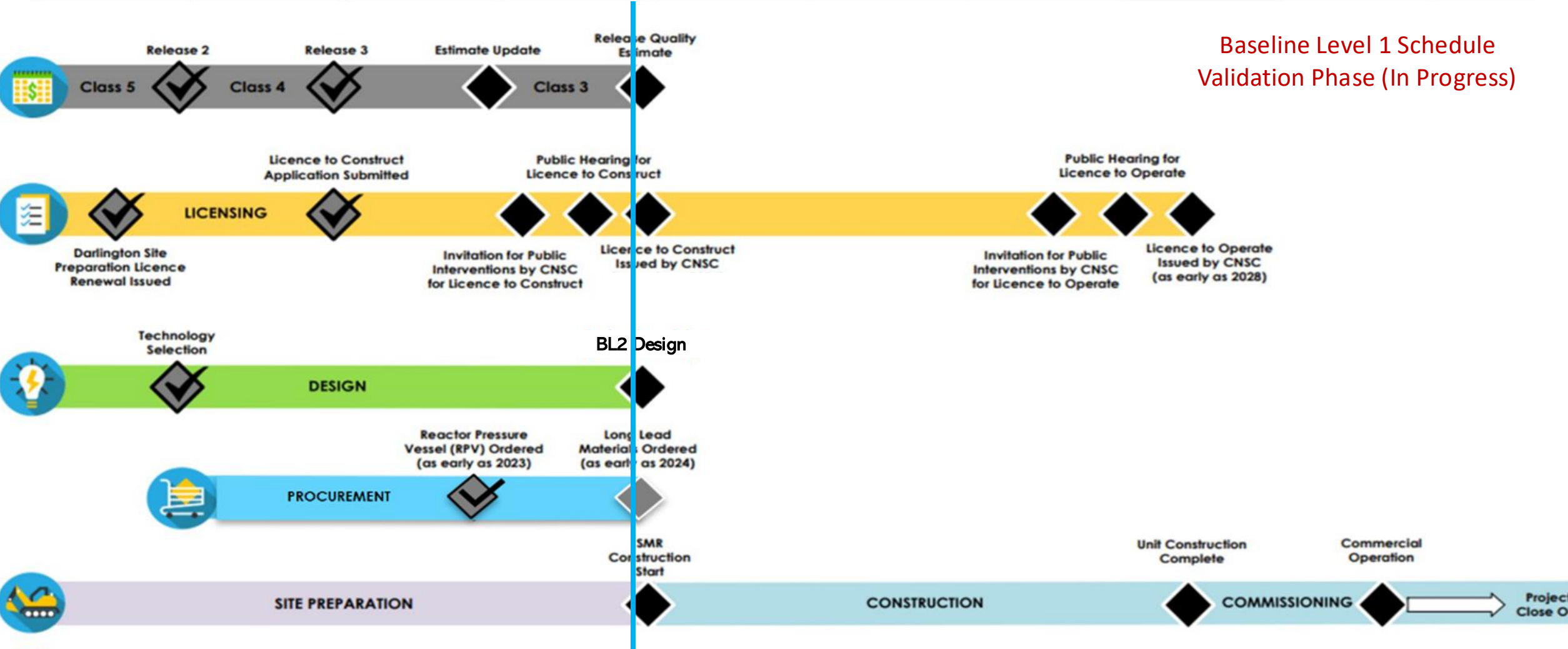
UTILITIES

CIVIL
Civil West
Civil East

NUCLEAR

INDUSTRIAL

2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
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Baseline Level 1 Schedule Validation Phase (In Progress)

INDIGENOUS ENGAGEMENT Opportunities for engagement with Indigenous Nations and communities and the public are offered throughout all phases of project planning and execution.

SMR: Small Modular Reactor
 CNSC: Canadian Nuclear Safety Commission

Integrated Digital Delivery

PIMS & Toolkit



**BIM & Information
Management**

**Digital Construction
Coordination**

**Geo-Spatial Data
Management**

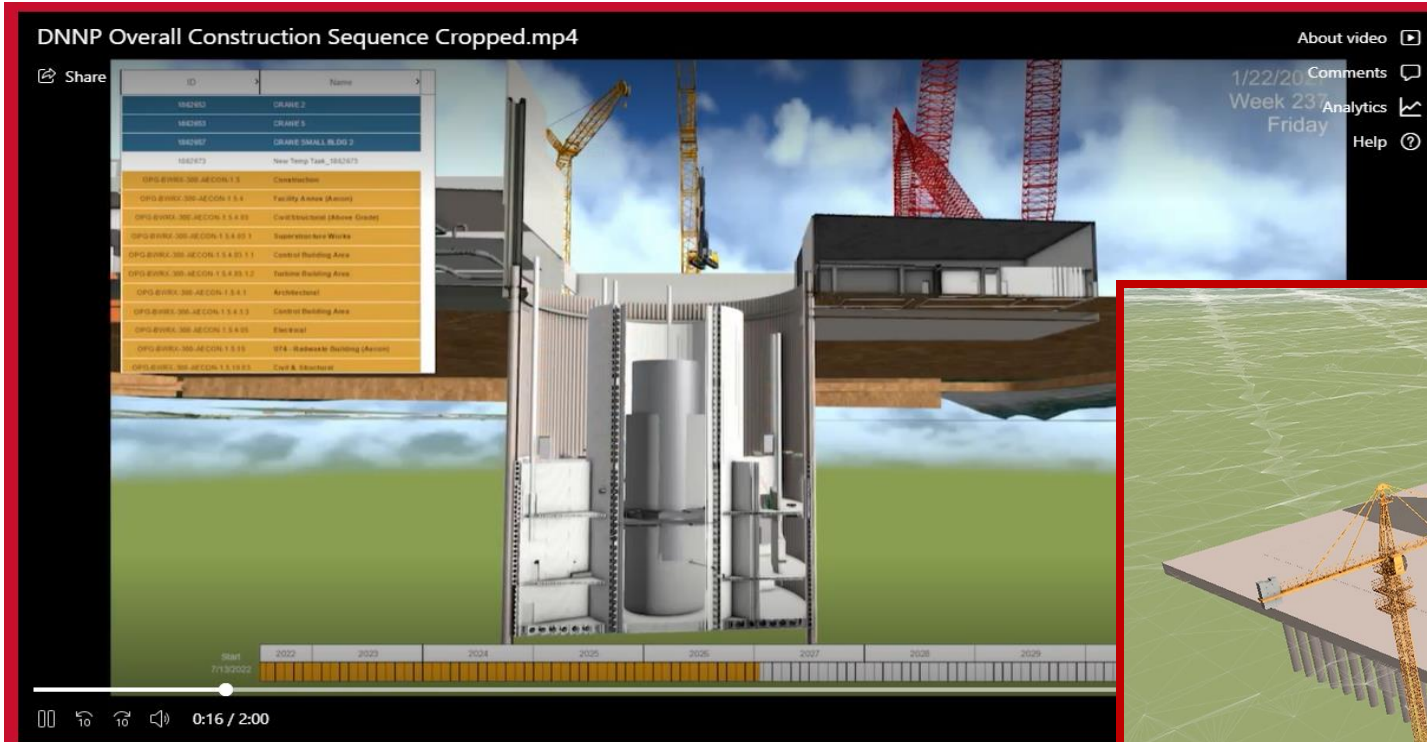
**Digitally Integrated
Survey & Geomatics**

**Digital Field
Work Packages**

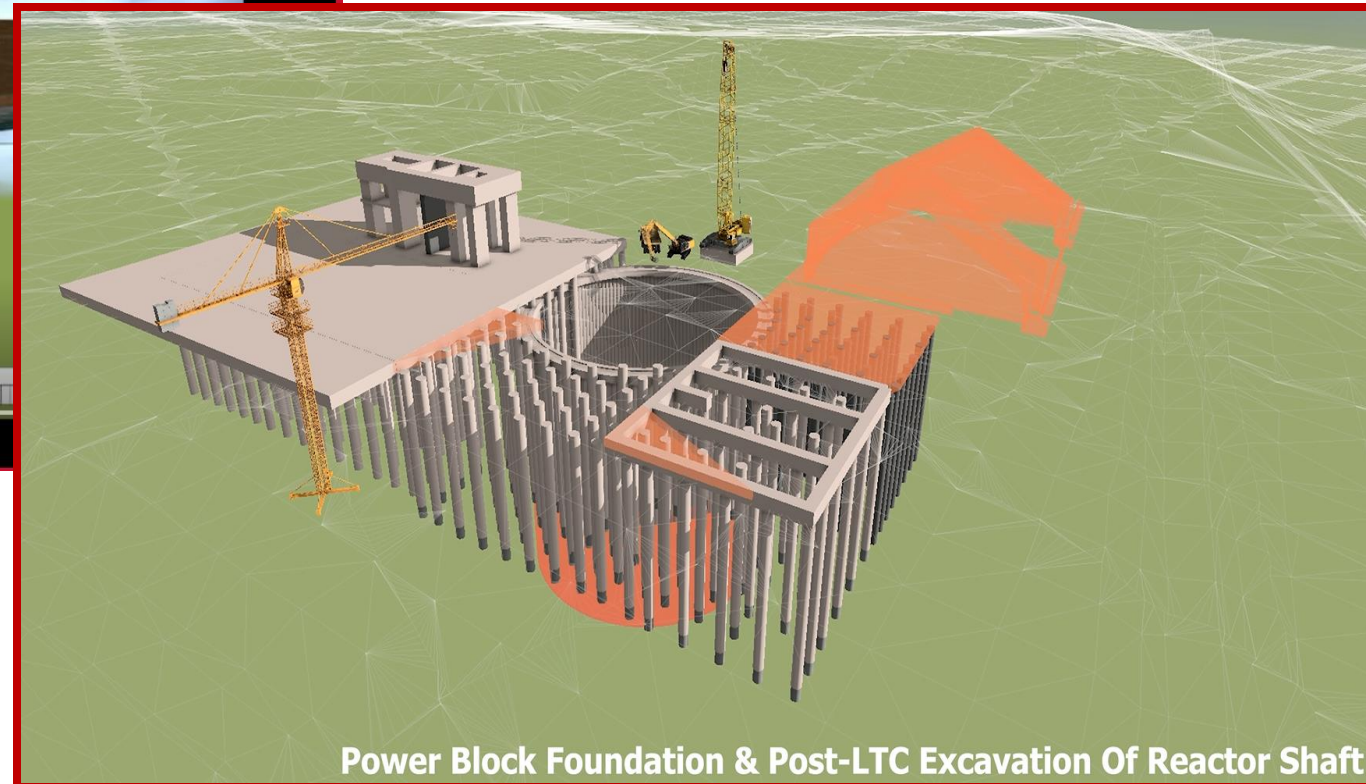
**Graphical Progress
Monitoring**

Aecon 4D / 5D Modeling (3D + Schedule and Cost)

AECON



Aecon is employing 4D / 5D modeling in design, planning, and execution of new nuclear construction projects.

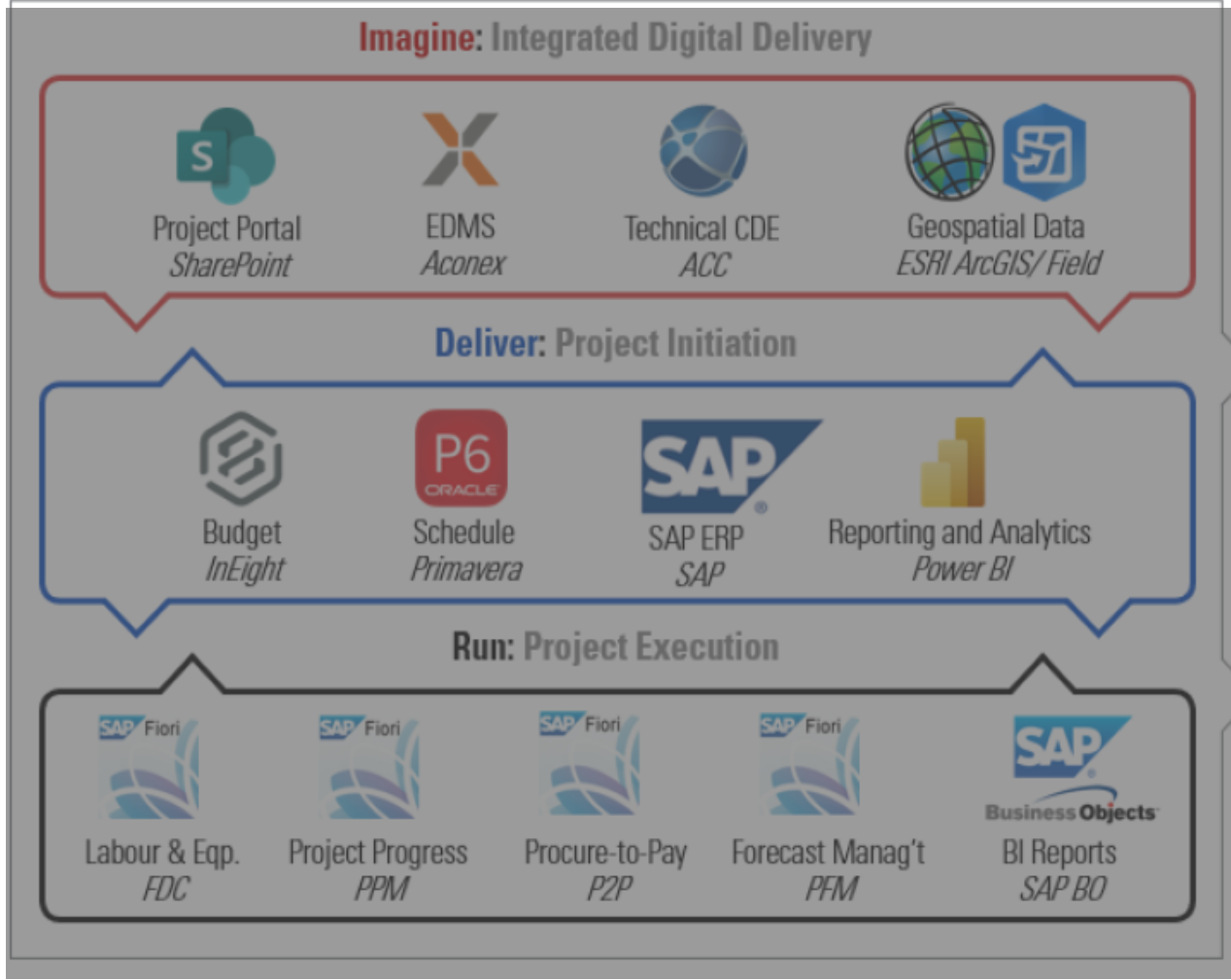


Integrated Digital Controls



Typical construction project challenges

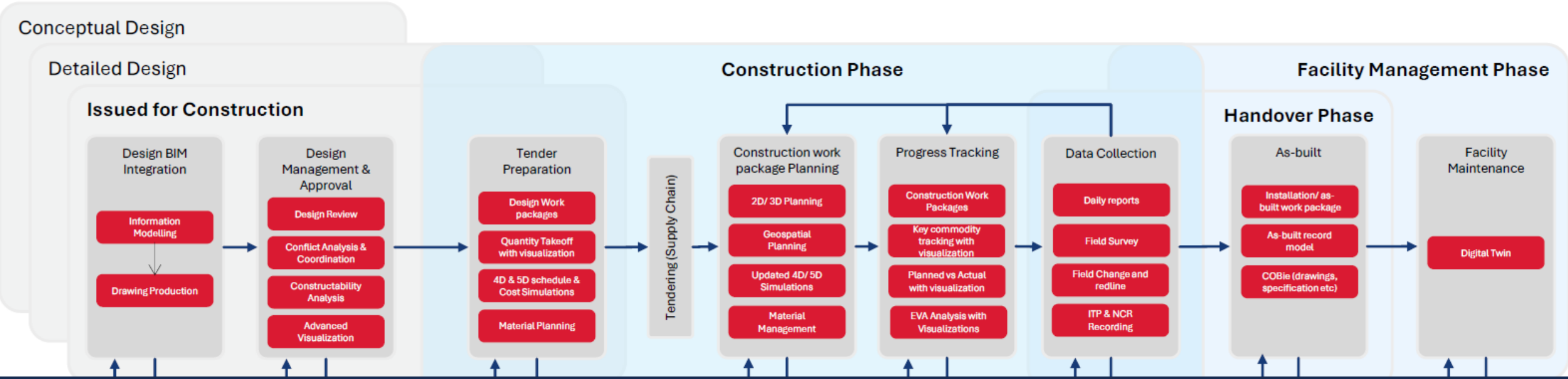
- Poor communication
- Unrealistic expectations/Bad forecasting
- Poor productivity and profitability
- Poor project performance
- Inadequate project controls
- Manual processes & Rigid systems
- No workflow automation and duplicate process



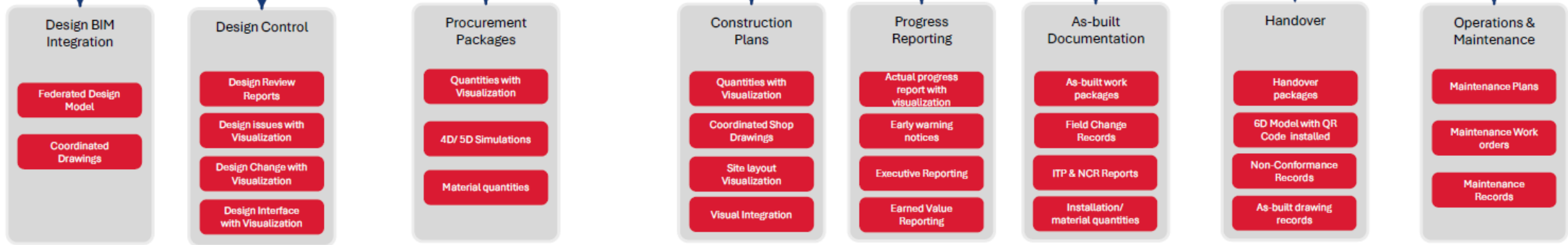
Value delivered

- No silos
- Near real-time reporting
- Integrated project controls, accounting & finance
- Quality records accounted for progress calculations
- Union & Non-Union Payroll Processing
- Single source of truth**
- Workflow automation
- No duplication of processes

Change Management



DNNP Project Information developed for DNNP will be leveraged for NOAK deployment
 Increasing confidence, establish a project baseline and optimize for planning, validation and execution





Launch Shaft

Reactor Shaft

Forebay Shaft

As of: October, 9 2024

Distribution

Percentage

Completed

In-Progress

Remaining

All

Total Piles Complete

143 84%

of Piles % Complete



King Piles Complete

66 78%

of Piles % Complete



Filler Piles Complete

77 91%

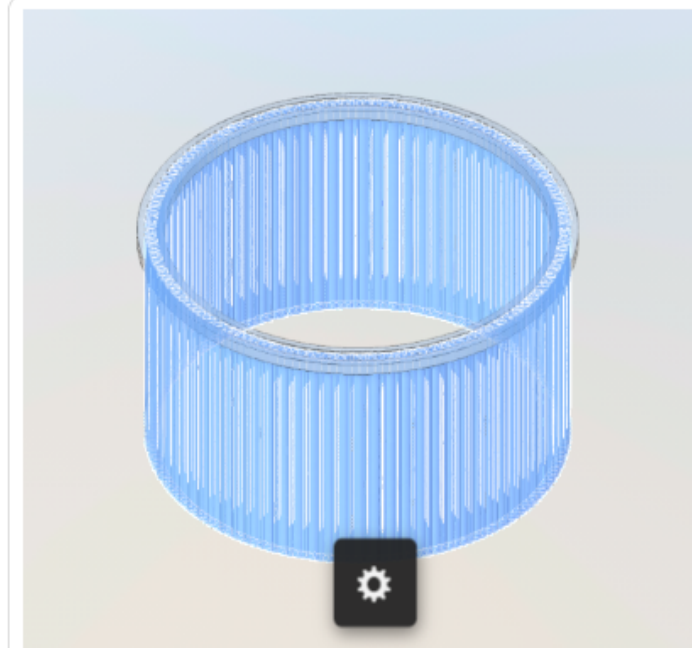
of Piles % Complete



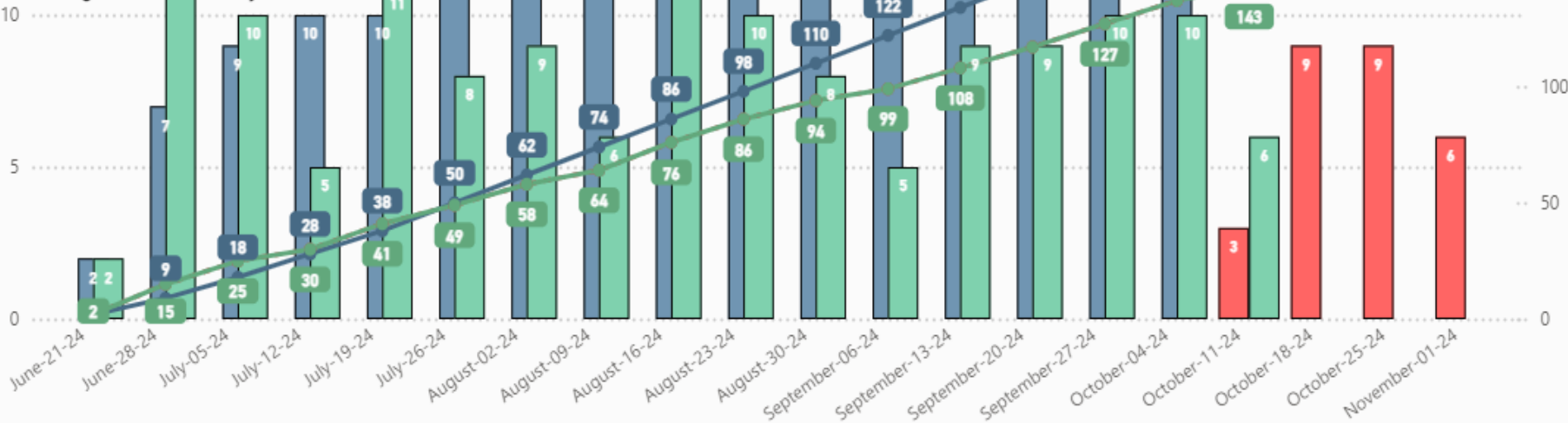
Remaining Piles

27

Total Remaining Piles



Average Planned Weekly Production



Legend: Forecast Piles, Planned Piles, Actual Piles, Forecast Piles Cum., Planned Piles Cum., Actual Piles Cum.

name	Planned Finish Date	Actual Finish Date	Complete
Filler Pile [307375]	05-Aug-24	9-Oct-24	✓
Filler Pile [307507]	21-Aug-24	9-Oct-24	✓
Filler Pile [307387]	26-Aug-24	8-Oct-24	✓
Reinforced Pile Rebar [306431]	26-Sep-24	8-Oct-24	✓
Filler Pile [307486]	21-Jul-24	7-Oct-24	✓
Reinforced Pile Rebar [306317]	14-Jul-24	7-Oct-24	✓
Filler Pile [307378]	10-Aug-24	4-Oct-24	✓



OUR PROGRESS



Admin building (critical):

- Grading Complete
- Awarded to Gillian
- Mobilization 1st week of Feb 2025

Fab Building:

- Foundation complete
- Start structure install on going
- On track for completion sept 2025

Site Offices & Operational

Forebay pumphouse shaft :

- 55% secant piles complete
- Secant piles completion March 25

Pre-assembly building Critical:

- Soil substitution complete;
- Structure on site;
- Foundation completed
- Walls 50%

Reactor Building shaft :

- 170 secant piles completed;
- Capping beam completed;
- Dewatering ongoing ;
- Excavation start 16th Jan 2025

Wet utilities:

- 62% complete

Launching shaft:

Secant piles and Cap beam complete
excavation Start February 2025.

Dry utilities (power):

- 27% complete;
- Fabshop connected to temp; power

Tunnel Works (Critical):

- TBM FAT 15 feb 2025;
- STP FAT 10 feb 2025;
- Excavation to start in April 2025

Marine Works (critical) :

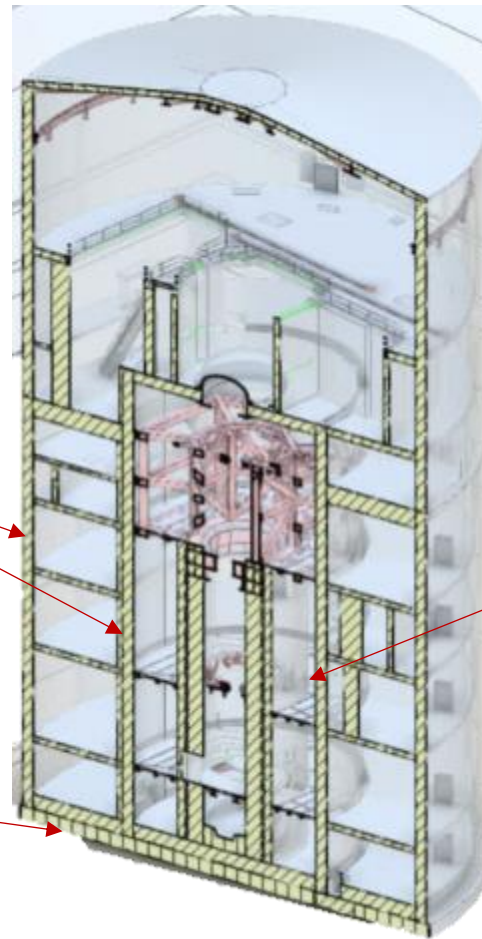
- LOI issued to start mobilization in Dec 2024
- Works to start in Aril 2025

Design → Manufacturing Development Update

**BWRX-300 Reactor Building
Design Configuration
Steel Concrete (SC)**

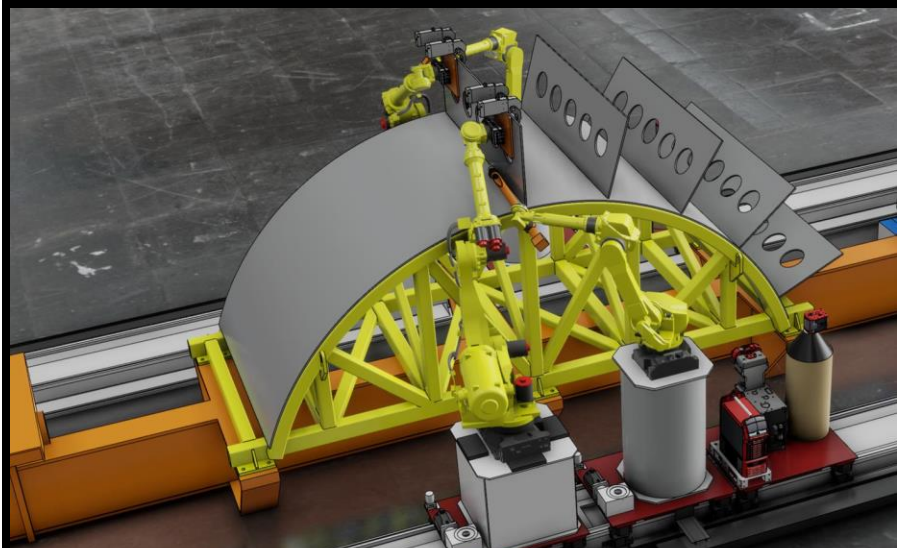
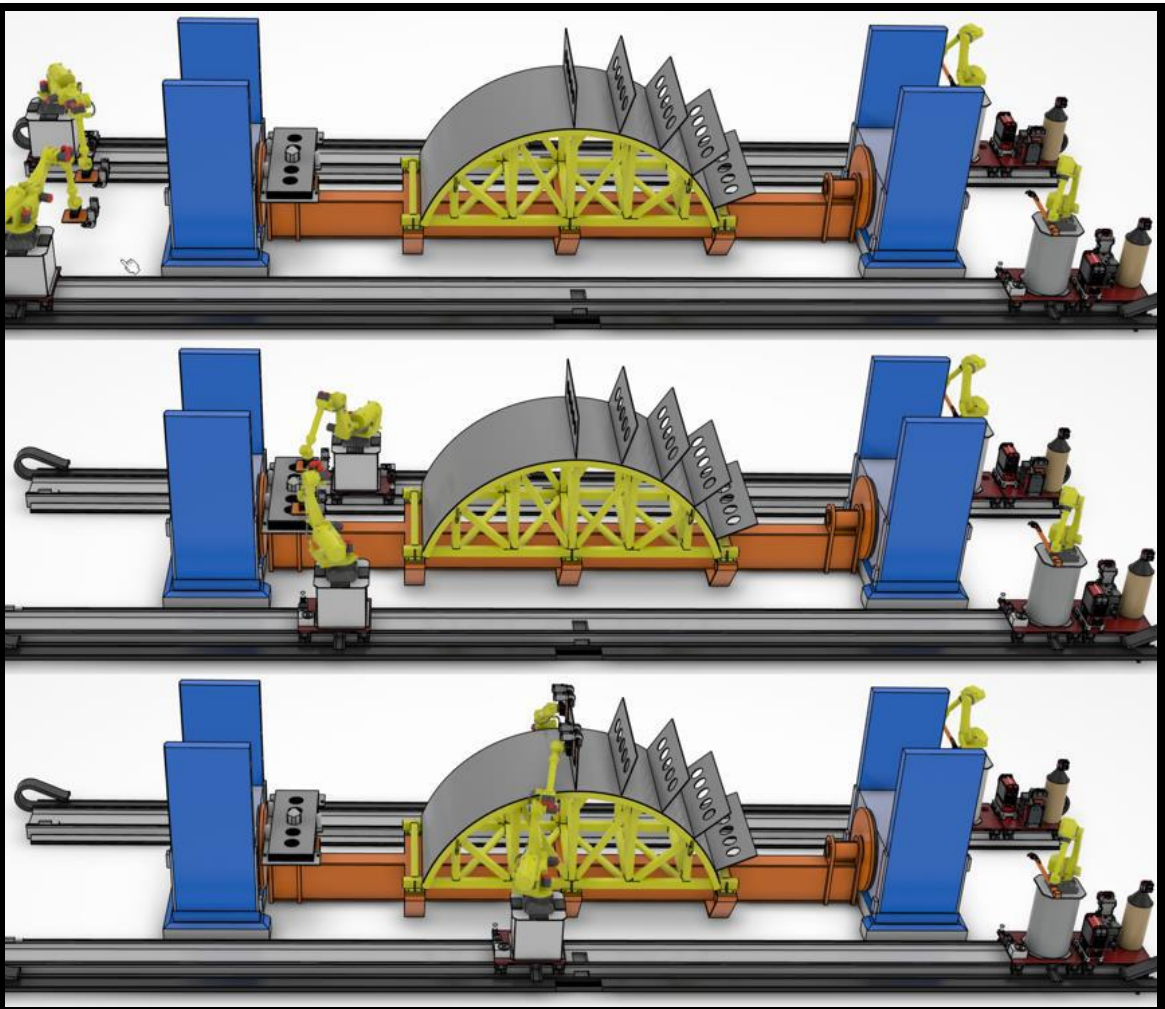
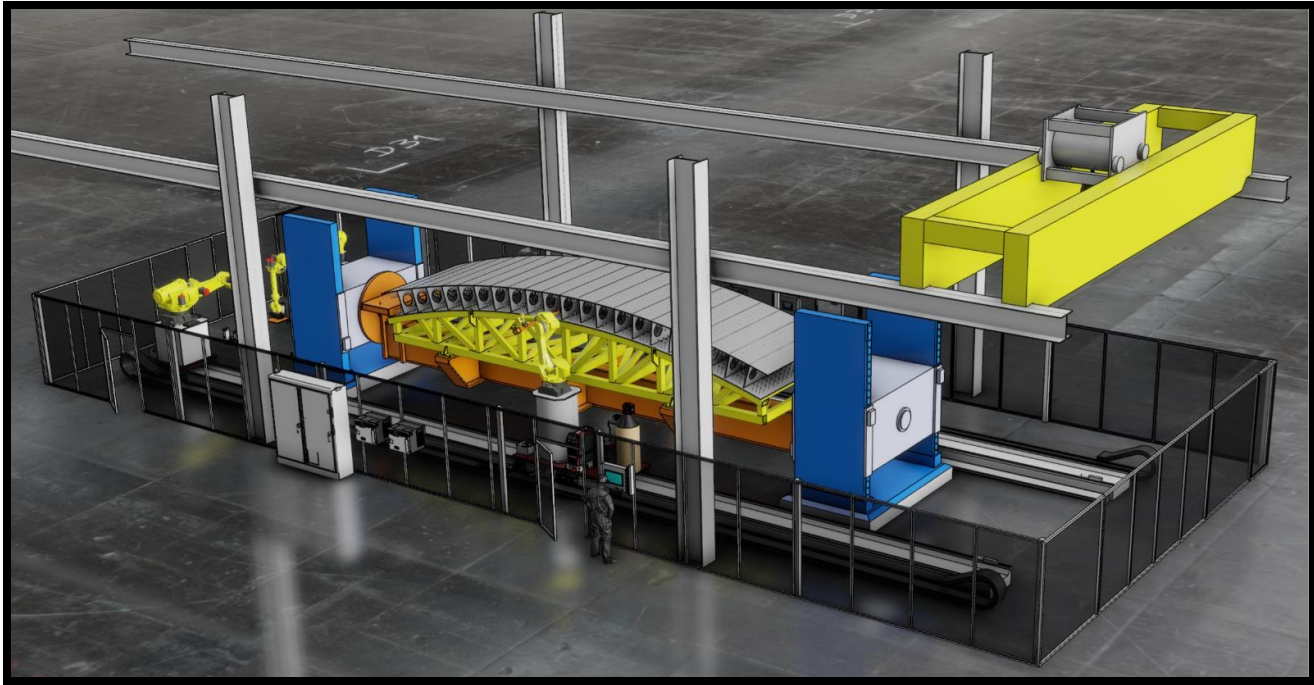
Curved Wall
Elements

Thick Floor
Sections



High strength
containment

Cambridge Nuclear Fabrication Robotic MCAW/GMAW Welding



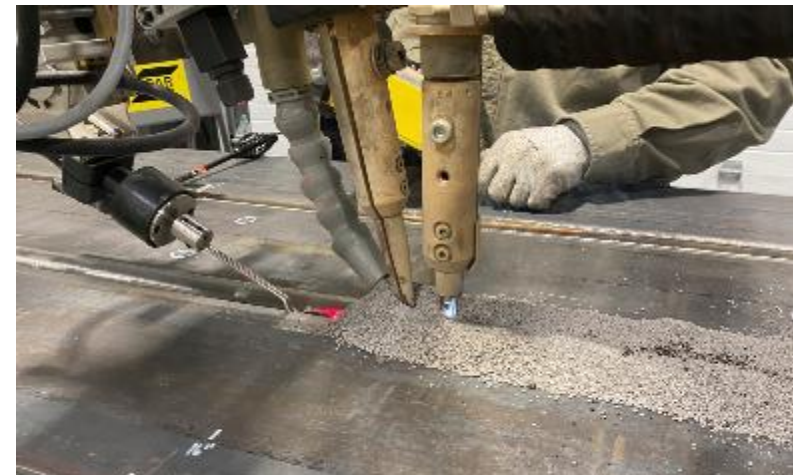
Aecon Welding Centre of Excellence

Critical steps for Production Welding Success

- Manufacturing Process Design
- Weld Processes & Parameters
- Weld Procedures
- Welding Equipment
- Weld fixtures and tooling
- Training Mockups
- Qualification
 - People and Process
- Pre-Production Validation
- Production QA & Control

**AECON****WELDING**
CENTRE OF EXCELLENCE

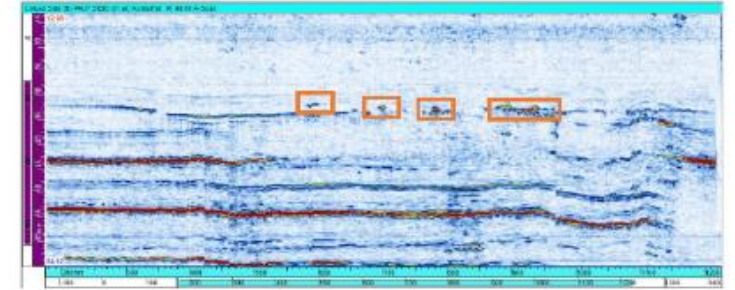
Design Guidance Manufacturability Through R&D



Weld Process Development

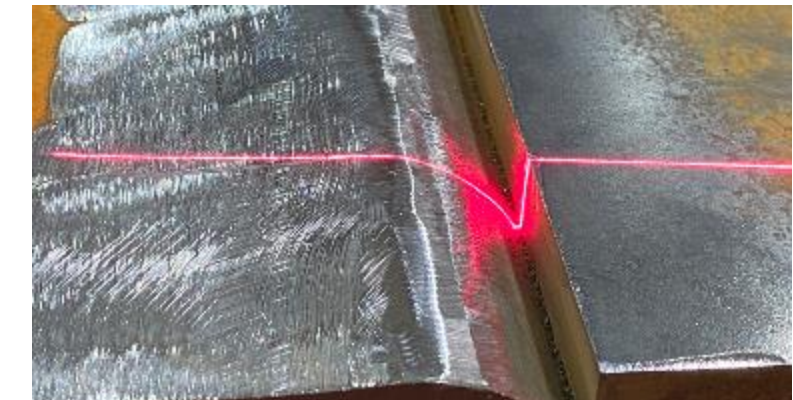


Robotic Assessment



An important portion of the weld joint is visually unacceptable (underfill), which makes all sort of different signal coming from the underfill which were not evaluated.

Phased Array Ultrasonic Testing Development



Weld Joint Laser Profile Measurement



Weld Deposit Optimization



Stud Welding Trials

Design Guidance

Manufacturability Through R&D



DPSC Scale - Model Wall Fabrication



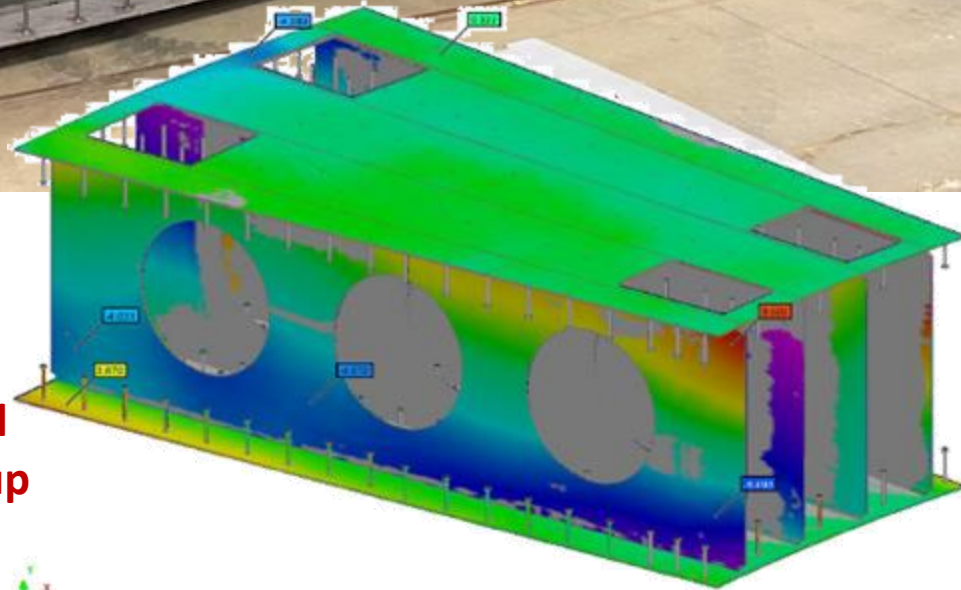
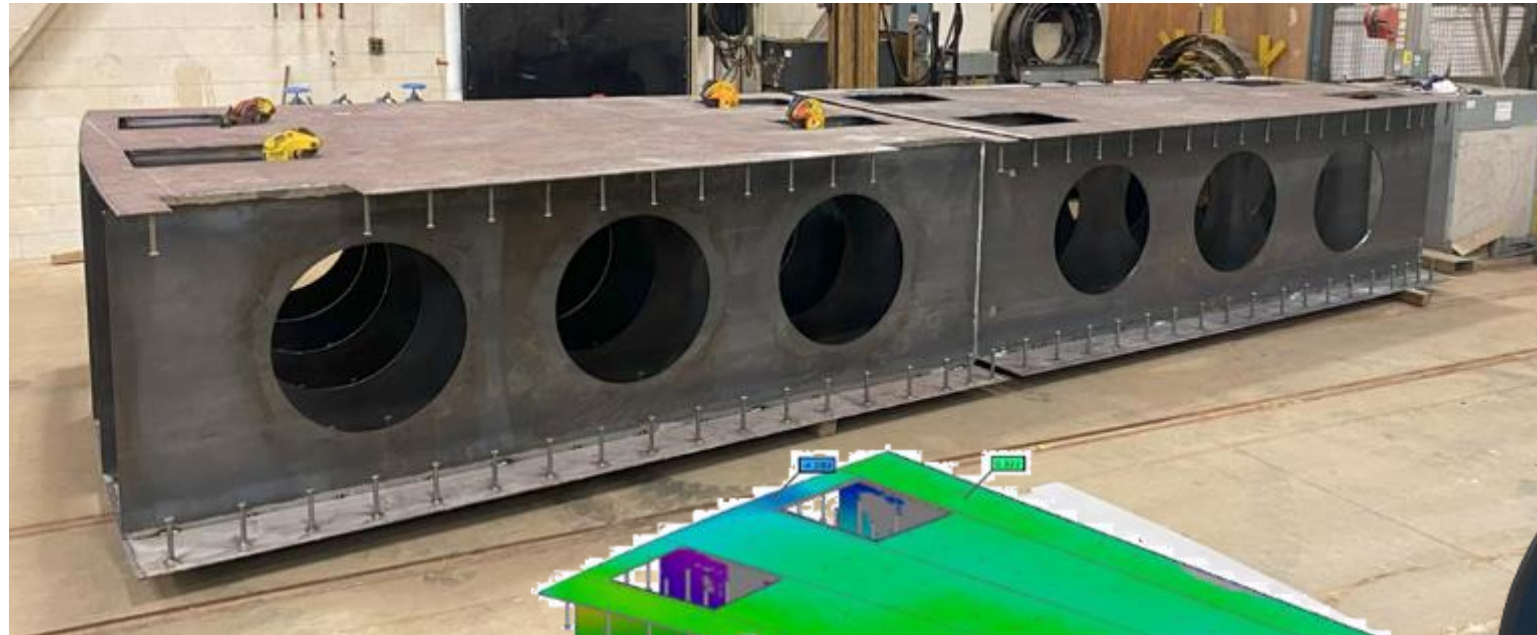
Basemat Scale Fabrication



Fabrication Tooling Development

Design Guidance

Manufacturability Through R&D



3D LiDAR
Metrology
Digital Twin and Virtual
Field Construction Fit-up

Robotic Stud Welding



Stud Welding in Industry

- Typically manual
- Hand-held gun, very repetitive and laborious
- Difficult to control placement consistency, position, angle
- Maintaining productivity rate is challenging long term

R&D Testing of Welding Machines

- Validated and tested automated weld gun
- Sample trials and selection



Robotic Stud Welding Development

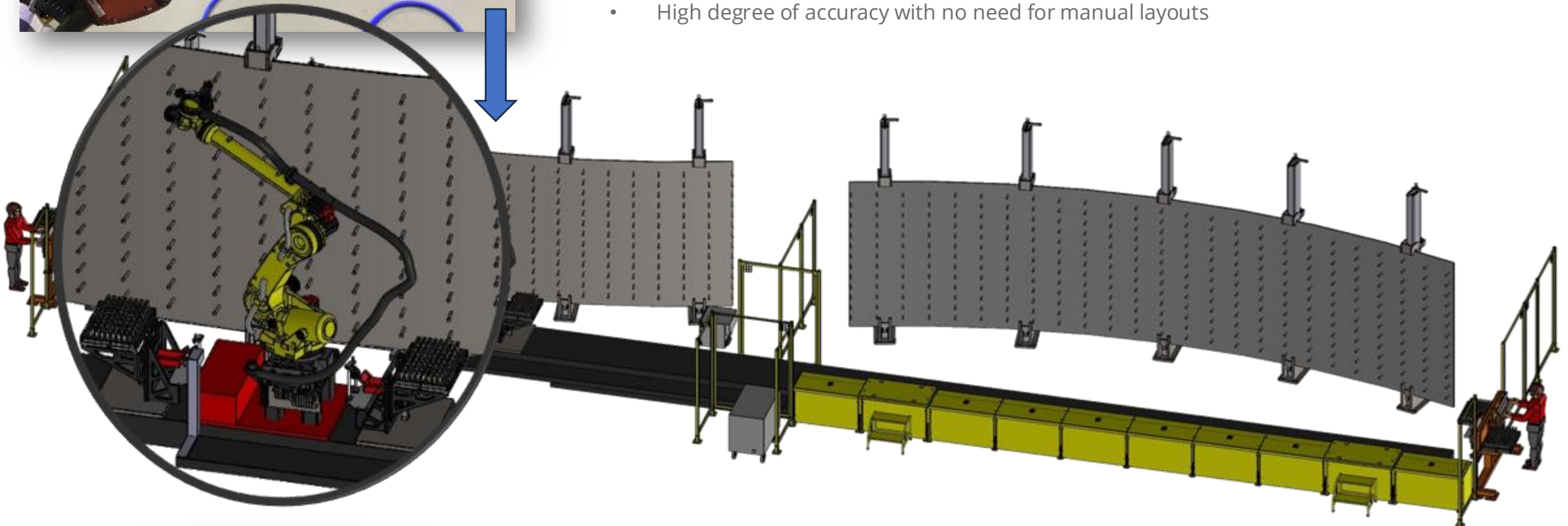


The Challenge

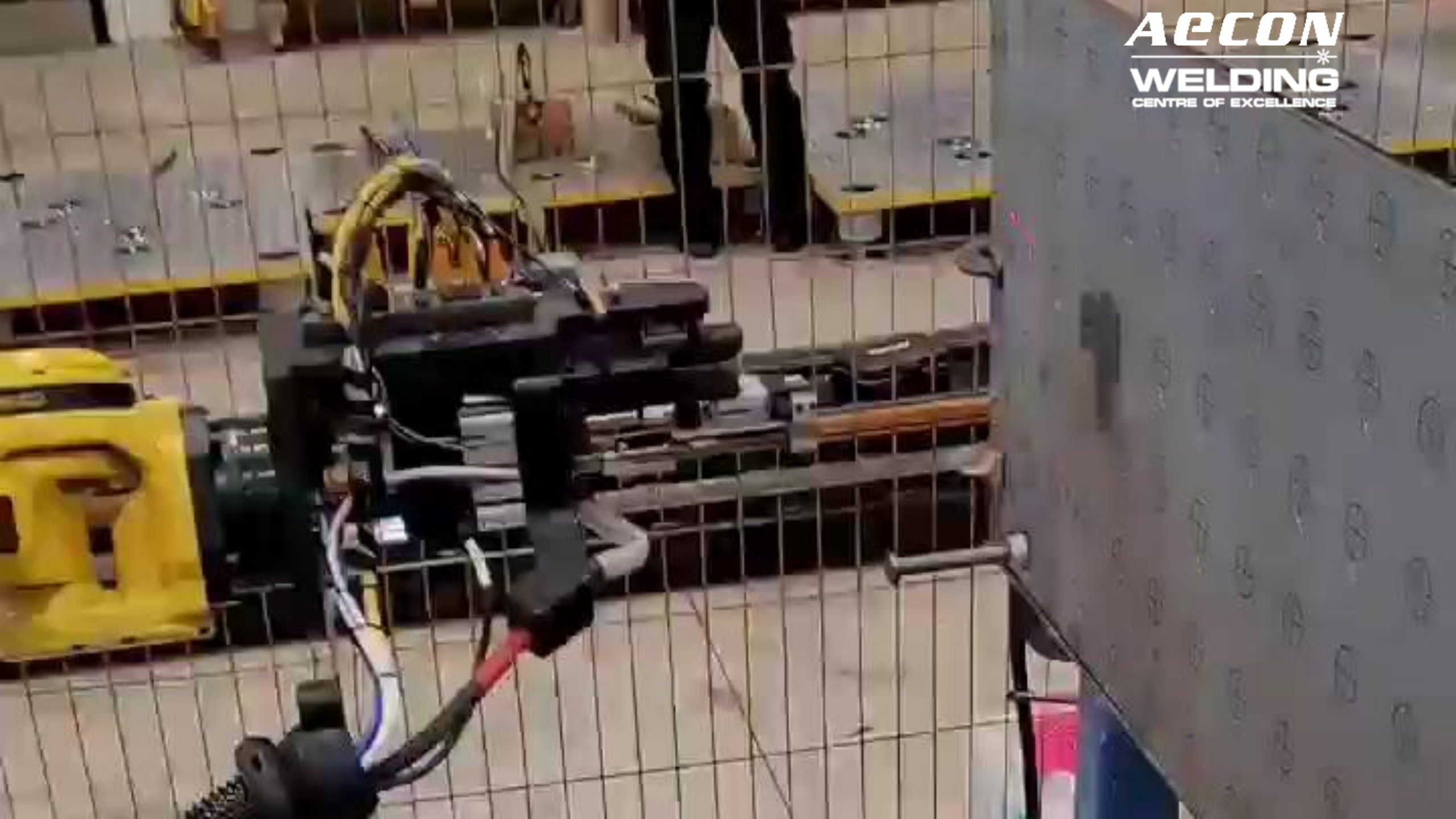
- Take the manual welding approach, and apply it to a fully automated system
- Large volume repetitive process

Reduction In Layout and QC Inspection

- CNC validated parametrics define stud placement and implementation
- High degree of accuracy with no need for manual layouts



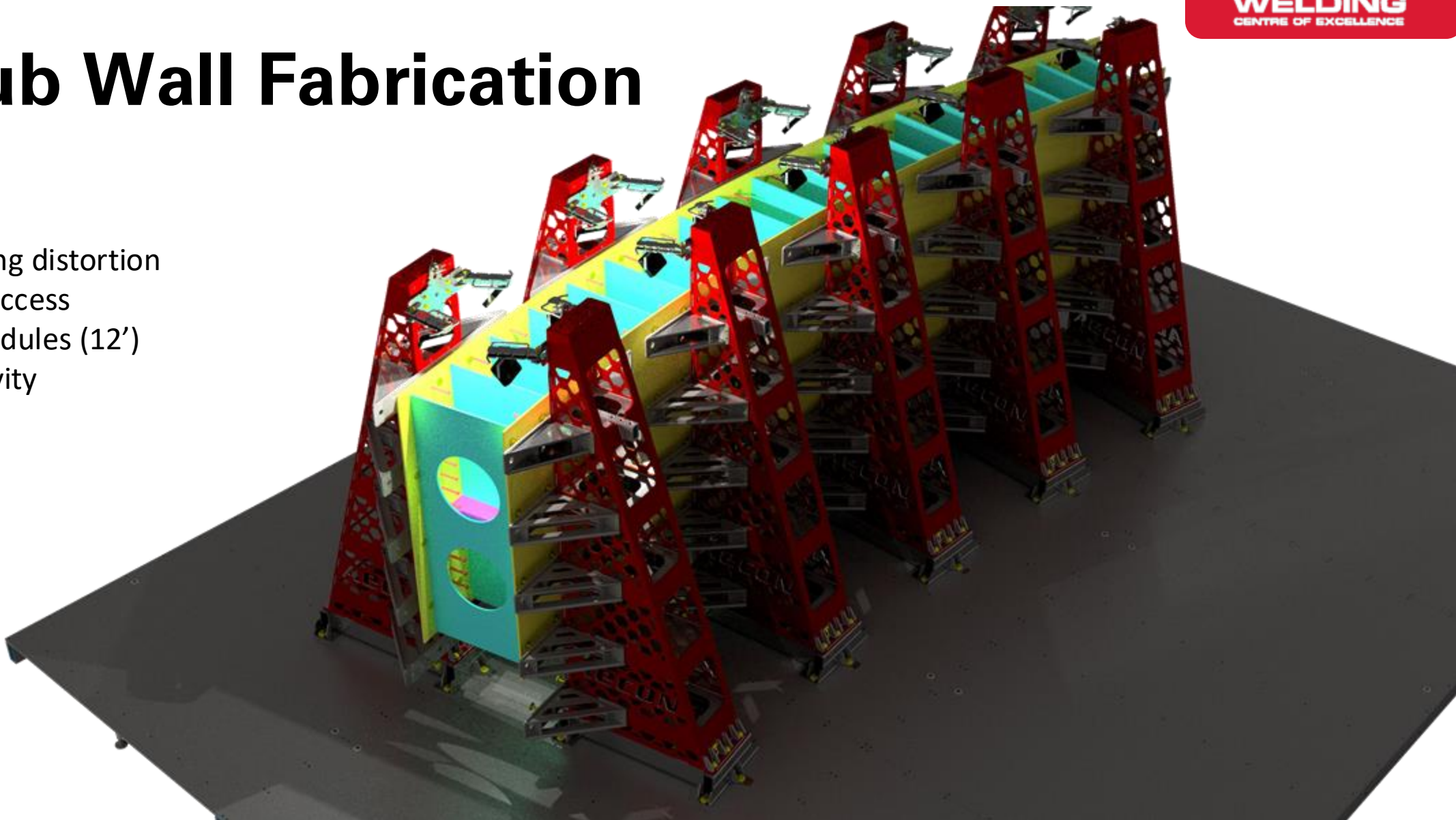




Stub Wall Fabrication

Challenges:

1. Controlling distortion
2. Welder Access
3. Taller modules (12')
4. Productivity

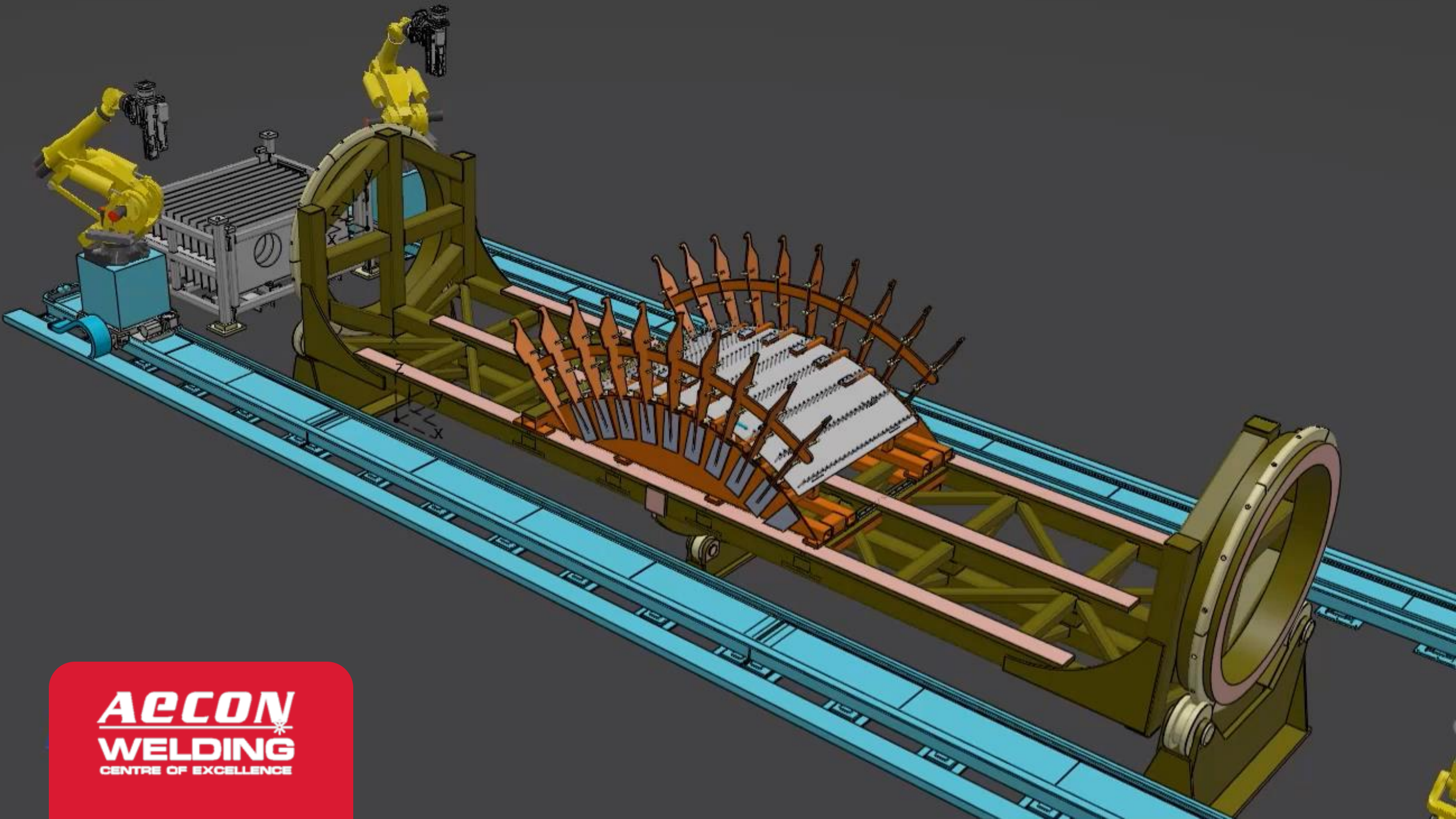


Internal Tooling Development

Vertical Integration Design, Cut, Fab, Weld



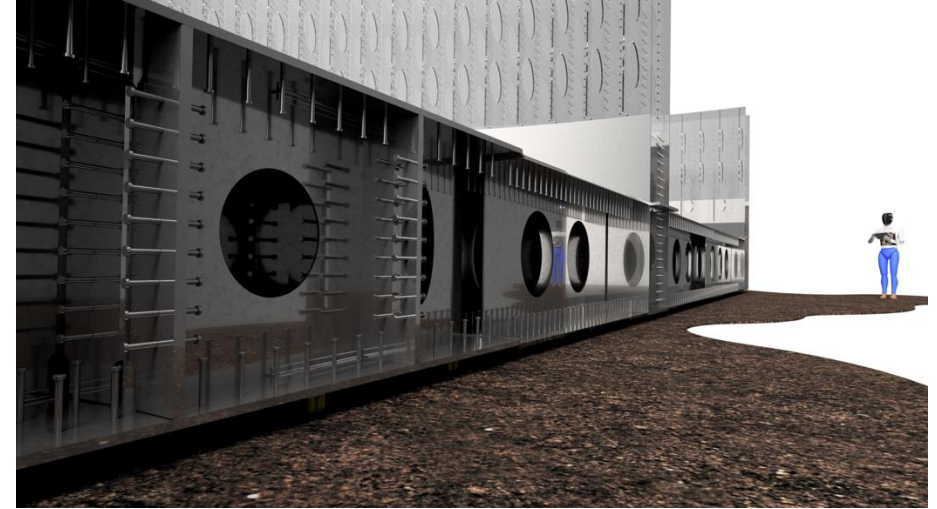
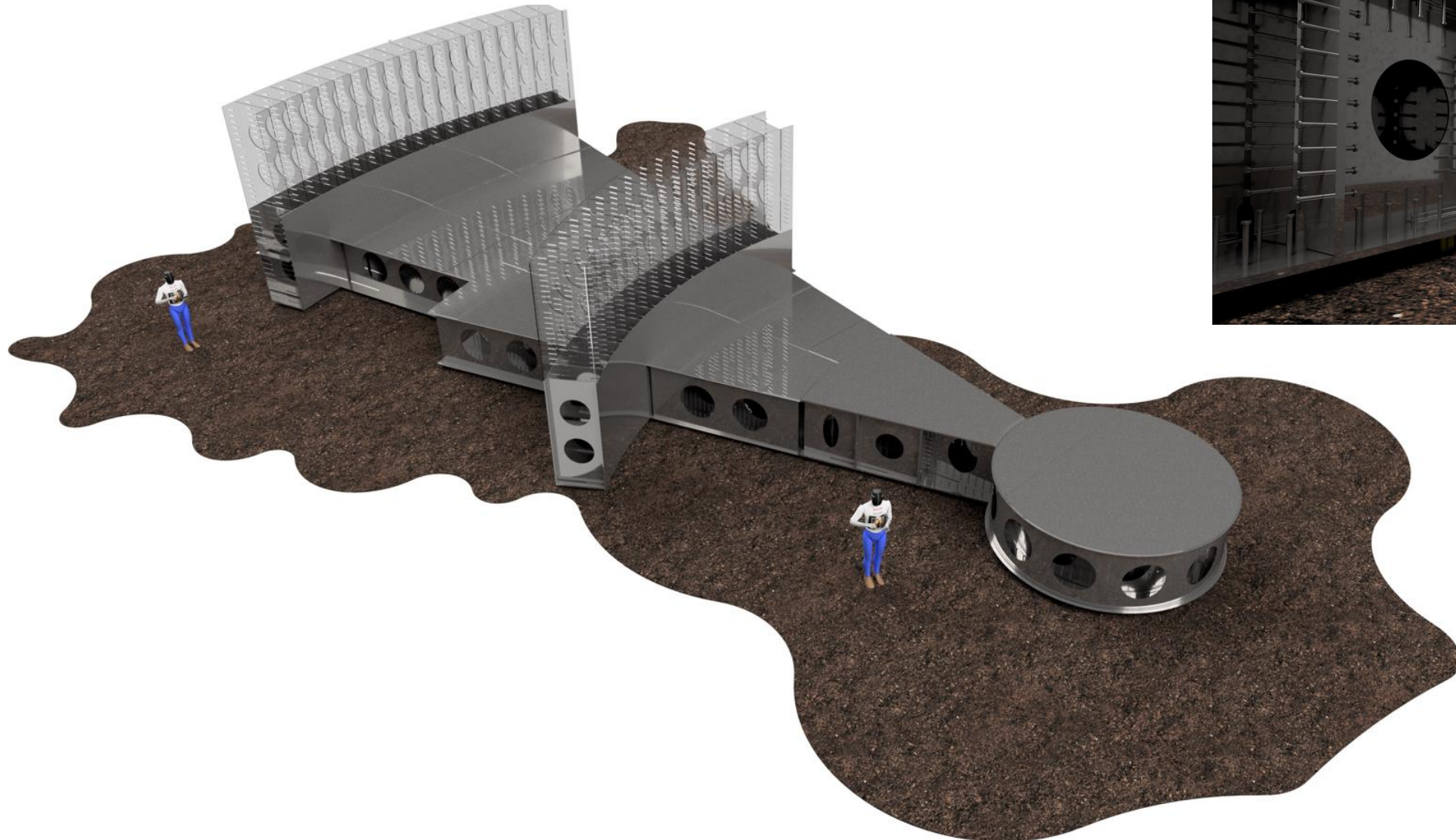
Basemat Prototype with Fixturing – Full Scale
Fixturing Controls and Limits Distortion from Welding



AECON
WELDING
CENTRE OF EXCELLENCE



Partial Basemat Mockup – Full Scale Demonstration



Our Role & Vision

Canada's premier Nuclear Fabrication & Construction Partner we are committed to:

- Deliver the FOAK Unit 1 (+3) at Darlington - Integrated Project Delivery (IPD) model
- Continue to lead with manufacturability, supply chain, constructability and drive value into the design and pre-execution planning, estimating and enabling project success
- Take a Program View vs Single Project Focus (4 Unit DNNP Commitment + Deployment)

Supporting Deployment of BWRX-300

- Foster Collaborative Contracting & Delivery Models with Owners and Partners
- Support Project Set-Up, Planning & Development – deliver value from our FOAK experience
- Ensure Lessons Learned / Optimizations are 'hard coded' into Standard Plant / Site Specific, activities resulting in a repeatable, de-risked approach with focus on localization and regional approach
- Focus on Partnerships and seek teaming arrangements with complimentary capabilities, capacities with aligned values and commitment to the Project / Program

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