Robust By Design

SAFE, RELIABLE & INNOVATIVE

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Trussbot

Tank/Silo internal automated hydro blasting ,painting and inspection system

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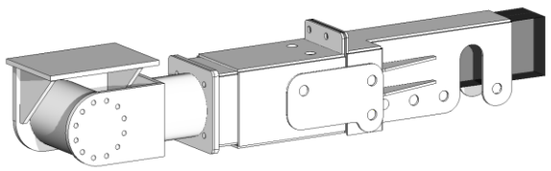
About us

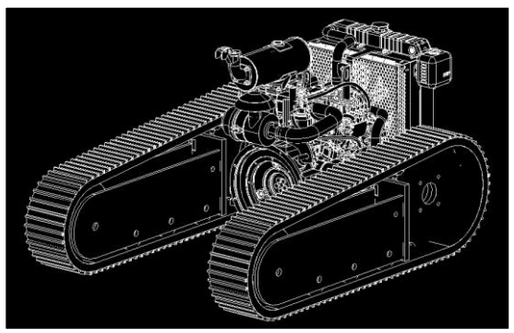
Robust By Design is a proudly owned and run Western Australian business that prides itself on safe and innovative design and construction.

We believe that the time taken in the design phase ensures our products not only meet customer expectation but exceed it.

We have a in house design and engineering service complemented by our expertise in fabrication and product development that delivers best in class products for the mining and industrial industry throughout Australia.

Safe. Reliable. Innovative.





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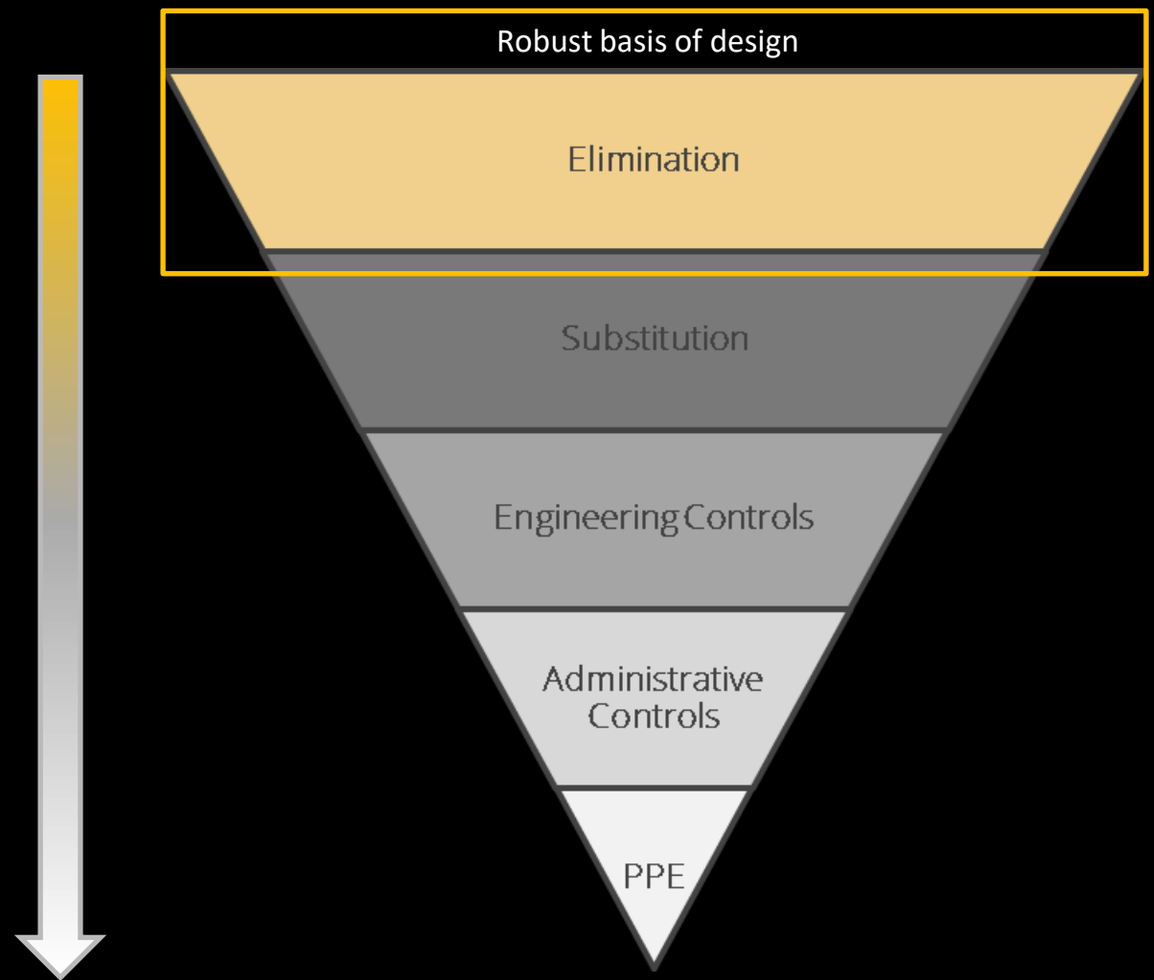
Hierarchy of Control



The reason we do business..

This is the ethos of our company. We understand the safest way to contol a hazard is through the process of elimination. Our team use this for the basis of design for all our prduct development. This ensures our products are not only cost effective but more importantly make the workplace safer for our most vaubale asset, people.

Trussbot

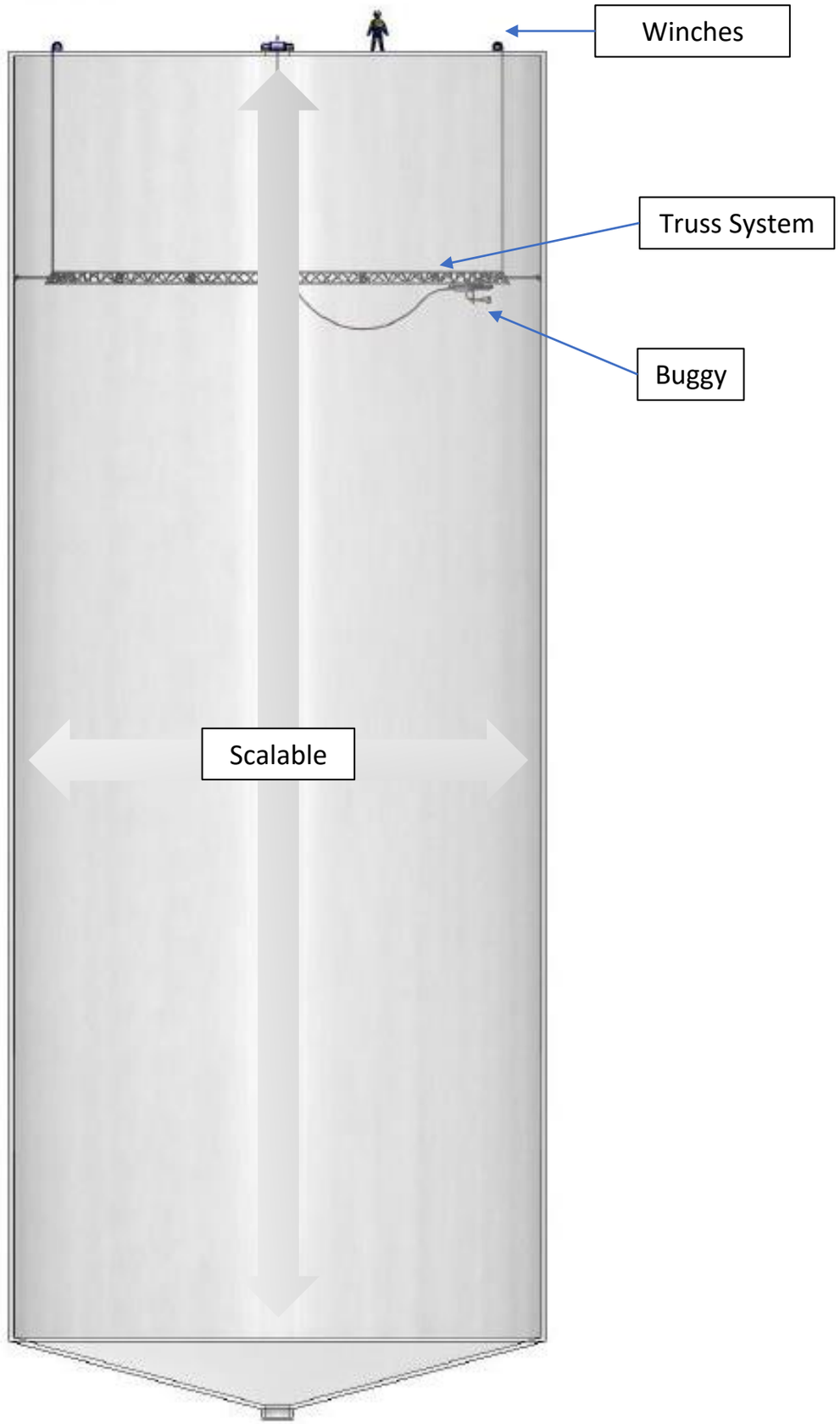
Trussbot is a new concept, “build in place” autonomous robotic system that is scalable, flexible and easy to use.

Trussbot is an automated robotic system designed to perform high risk internal or external works on heavy industry tanks and silos.

It can perform hydro blasting, painting inspection, to name few. The same methodology with only the tool to the robot changing to perform a different task.

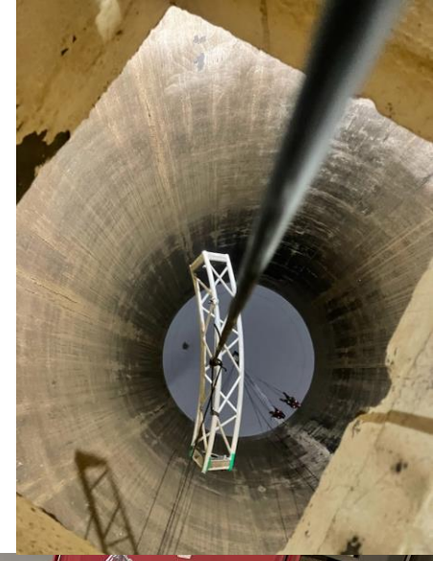
The System initially developed for the internal high pressure water cleaning and painting of concrete silos, can be configured to perform any repetitive task to walls internally or externally.

Trussbot is autonomous and requires minimal or no personnel to operate and can work 24/7, increasing safety, productivity and quality.



Construction

Made up of 4 core components



Truss

The truss system typically made from light weight Aluminium tube .

Designed to be assembled and constructed to suit different diameters or the profile of the structure.

Circular or straight almost any configuration can be manufactured.

Winches

Move the truss assembly and buggy up and down accurately

Almost any distance, up to hundred of meters if required

Many winches can be synchronised to move any size truss system

Buggy

Attaches to the truss and traverses on the truss system back and forth

The buggy also holds and moves a specific tools at angle and distance from the surface. Almost and number of tools can be attached to the buggy, blasting , painting, high pressure washing, inspection etc

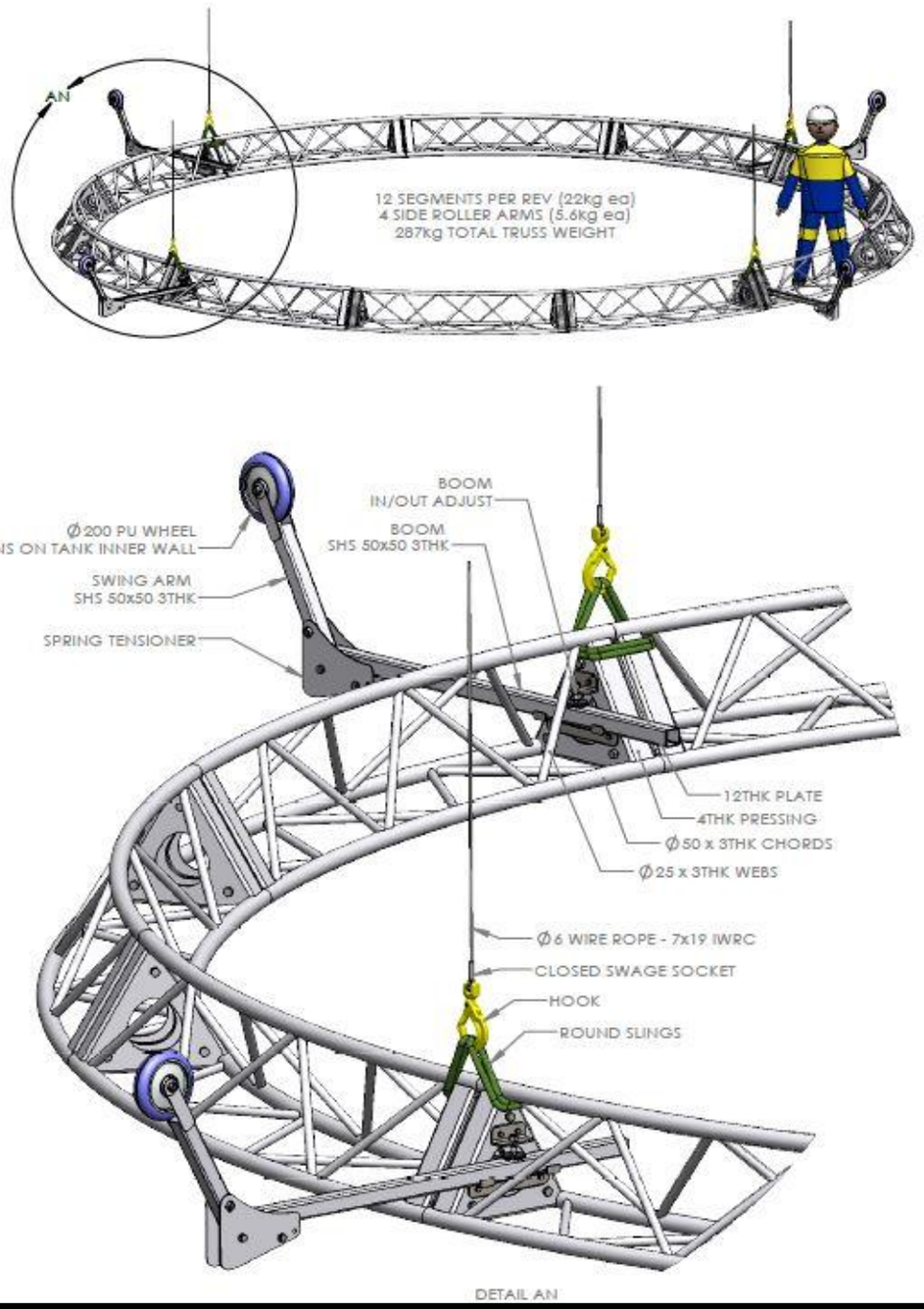
Automation

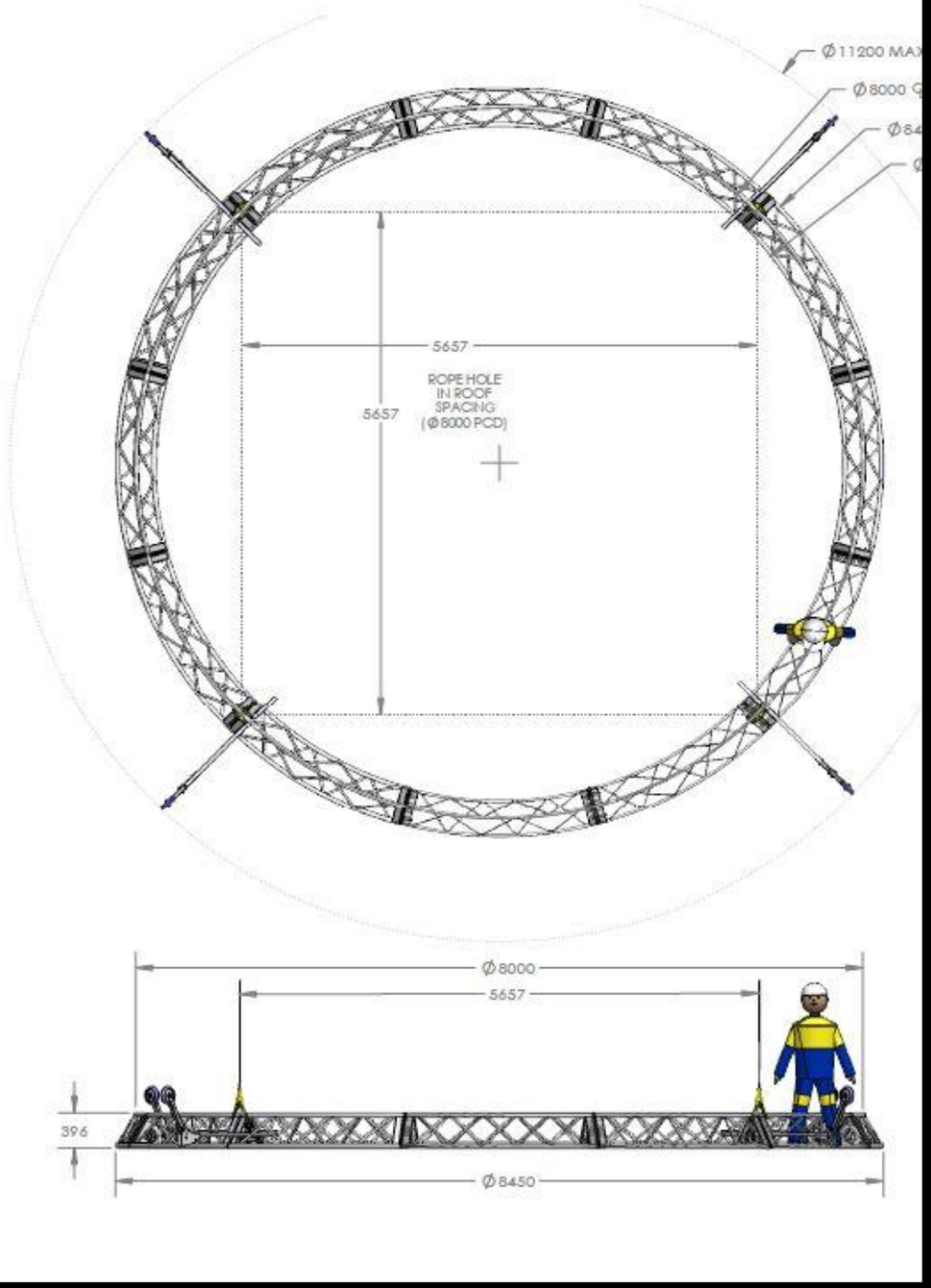
Predetermined programs of moves and patterns can be configured and stored and called up anytime

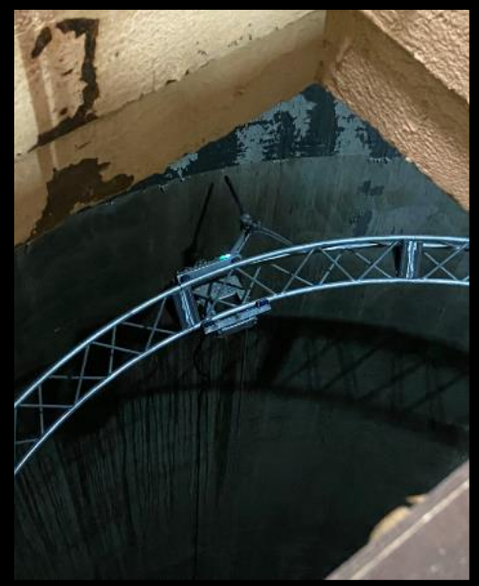
Diagnostics and Realtime videos can be viewed remotely

Fully autonomous ie once setup can operate with no operators

Accurate and repeatable

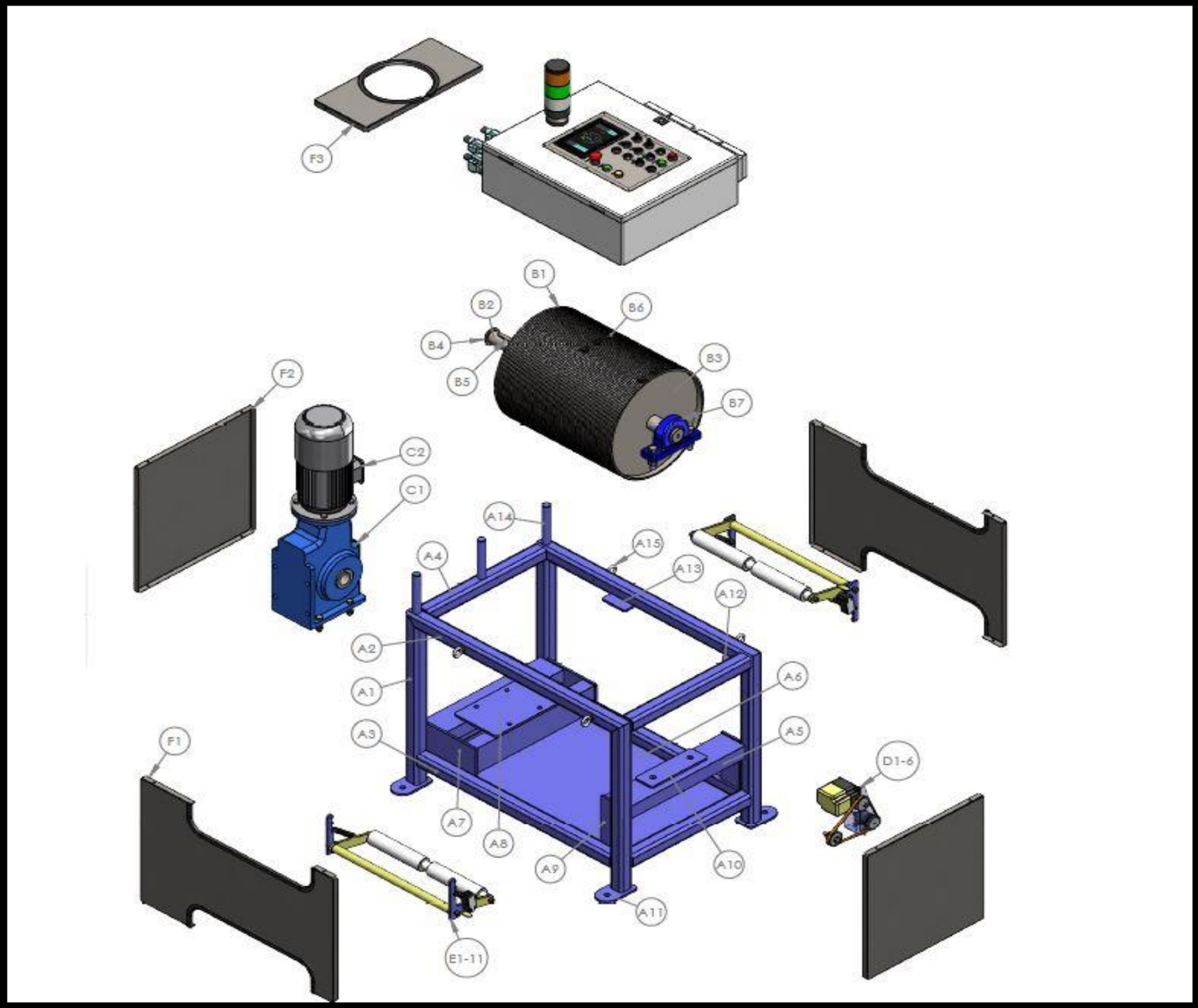






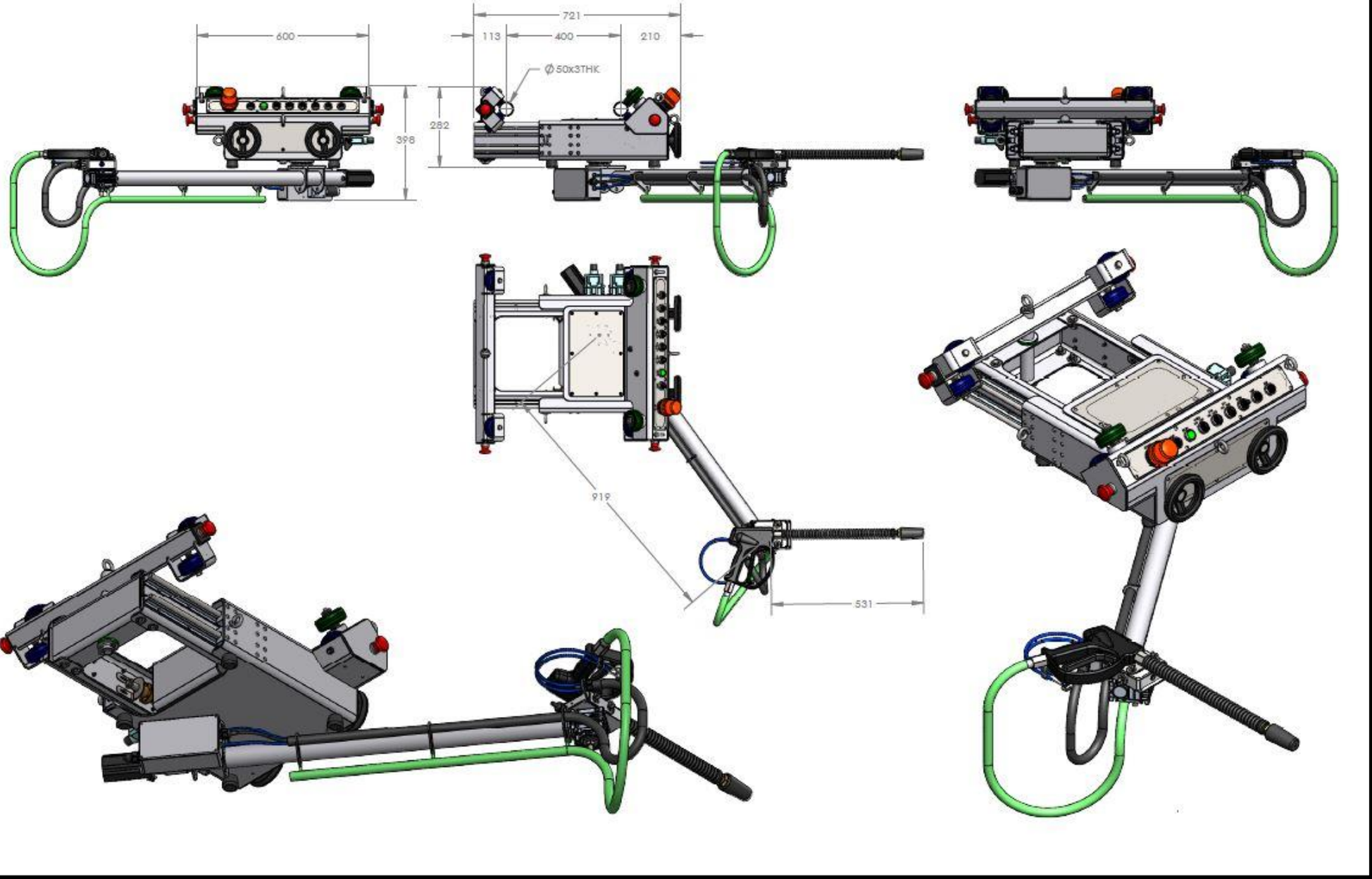
The Truss

The truss is a custom built aluminium track and can be manufactured circular or straight to suit the required internal or external dimensions of equipment. It is a scalable concept so can be designed to suit even the largest of jobs.
The track design is broken into light manageable segments to suit access as requirements of the vessel and the aluminium keeps the segments light for easy manoeuvrability and handling.
The track above was designed to suit a 10m ID vessel and divided into 12 segments to suit a 450mm access hatch. The spring loaded centralising wheels run up the inner wall to ensure the frame remains centred. The truss is supported from above by the custom automated winch system that moves the truss up and down the vessel, performing the task at hand.



The Winches

The Winch System incorporates multiple winches each with two wire ropes that are attached to the truss assembly via a vertical diversion sheave arrangement. The winches are digitally synchronised and move the truss assembly accurately vertically up and down. The winch drums are driven via a highly efficient gearboxes as well as a variable speed drive system with fail safe external brake. They can be place either on the roof of the tank or located at ground level as the wire rope is diverted through a vertical sheave into the tank from above. The sheave arrangement also incorporates safety devices and load cells that provides the feedback needed to ensure the truss stays level and are pre programmed to automatically change heights and maintain synchronisation with the other winch. The winches also house the electrical control system, manual operator joysticks and a digital touchscreen dashboard. The winches are custom built to suit the application and can be sized accordingly to suit.



The Buggy

The Buggy is a robot trolley that attaches to the underside of the truss assembly. It has an automated arm and wrist and is able to manoeuvre any tool (in the case pictured above a high pressure turbo nozzle), at any angle, pattern, distance or speed.
Actuators on the tool holder can be configured to turn devices or triggers on and off, open and close valves making the task completely autonomous and eliminating the requirement for people. An umbilical cord from the winches feeds the buggy that in turn relays position, speed, coverage and any diagnostic information required.
The robot buggy traverses around track system performing the work. Patterns for different tools and processes are programmed and stored in the system for the tasks being performed. To improve productivity (particularly for larger jobs) more robot buggies can be added to the track system and rather than completing a full sweep of the internal diameter each robot will perform a specific segment based on the number of robots. The robots are fitted with an auto distancing tool that will keep them evenly spaced around the track, ensuring consistent and repeatable coverage.

Control Panel

The Dashboard/Operator panel situated on the winch assemblies and includes all the controls required to control and program all of the functions of the Trussbot system, both in manual mode and fully automatic mode.
It also provides real-time status of the system whilst in operation and provides an audible and visual alarms and status of the system.
The main screen or dashboard provides information of the position of the respective axis for example the buggy location around the truss in degrees, the position of the arm and height of the truss system. It also provides the weigh on each of the wire ropes and any faults that may occur.
The winch screens provide more detailed setup parameters for the winches and any alarms or status of the winch.

Preprograming

The programming screen is where the patterns for the respective processes are configured.
Many options have been incorporated and with simple on off commands and values, an operator can configure and program the robot to perform the most complex of patterns very quickly.
New patterns or adjustments to the patterns are easily programmed and initiated immediately.
Specific tools and their respective characteristic can also be stored and called up anytime. Mulitple tools and processes can be played back in any order

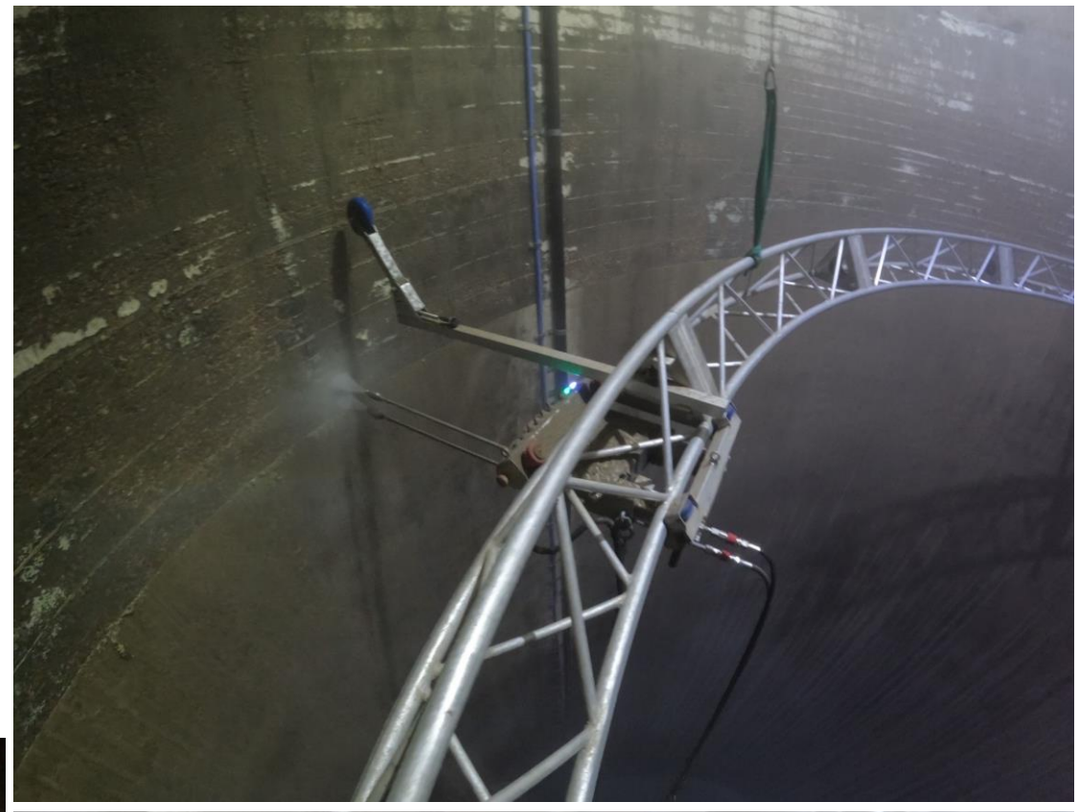
Some features include:
Horizontal and vertical fill patterns (ideal for blasting and painting)
Speed and step up or down adjustments
Rotation limits of the buggy (full or part circle patterns)
Tool on and off position (paint gun on off on the fly)
Clockwise or anticlockwise patterns

Once a pattern is defined the robot will perform the pattern until it is completed with no operator intervention.

Capabilities

Blasting rates of 150m2 per hour are achievable depending on finish and tooling

Hydro Blasting



Painting

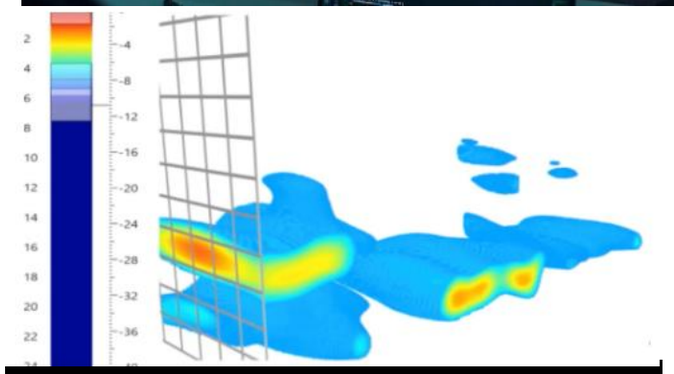
Inspection

Rapid, and cost-effective non-destructive testing solutions for scanning and imaging detecting sub-surface defects and anomalies.

Surface and sub-surface inspection and monitoring of concrete:

- Ground Penetrating Radar – GPR
- Ultrasonic Scanning and Imaging
  - Ultrasonic Pulse-Echo
  - Impact-Echo
  - Ultrasonic Tomography-
- Half-Cell Corrosion Mapping
- Surface Electrical Resistivity
- Realtime digital radiography

Scanning rates with the TrussBot of 15 m2 per Minute are achievable.



Trussbot can be fitted with any type of inspection device to map, test and record the structure of the tank. Defect parameters can be preprogramed in the software to suit the equipment specifications so the system will flag any irregularities. The camera will pinpoint any defects at a precise location, producing a map of the recorded area allowing inspection teams to interrogate the data.