# ENHANCE MAINTAINABILTY OF PRE-FABRICATION FACILITY

**CONTEXT**

Soilbuild Construction Group Ltd. (Soilbuild) has over 40 years of experience in construction services, with a sterling award-winning portfolio of residential and business space properties. It provides an end-to-end real-estate services, including Design and Build, Construction, and Project Management.

In 2015, Soilbuild was awarded to develop Integrated Construction and Prefabrication Hub ("ICPH") in Singapore, and has been pre-fabricating components, construction components as well as sub-assemblies (such as bathroom units) to build up local supply of such components. Through ICPH, it would bring about improved productivity in construction sites, higher quality control as the components are produced in a controlled factory environment and minimise noise and dust generated on construction site. As ICPH also automates most of the labour-intensive work, it will also create a safer work environment to the workers.

Equipment and machinery in the controlled ICPH factory facility are highly utilised. Therefore, regular and proper maintenance is of paramount importance for optimal uptime, not only to extend its life cycle and reliability, but also to ensure the safety level of our operators.

Currently, equipment and machinery maintenance scheduling rely on information collected from paper-based system. Further, this does not provide real-time data of equipment performance for predictive maintenance and therefore, It is often a reactive process where many times, maintenance process commerce only when a fault is detected. A undetected fault and equipment failure may result in complete or partial stoppages of the production workflow, impacting operational costs and delay in component delivery. During such time, if spare parts are required to fix the equipment or machine, the factory facility will experience further down-time for the parts to arrive.

Soilbuild is therefore seeking for a digital solution that can optimally maintain these equipment and machines within the production facility. Beyond managing and optimising scheduled maintenance activities taking into account production delivery time, the solution should also provide preventive maintenance measures to detect the performance of the equipment and create intervention maintenance measures through an integrated and structured approach to troubleshoot and examine the issue. In time, the solution should predict the degradation of performance or support predictive and prescriptive maintenance.

A dynamic virtual representation of the physical assets in the ICPH or a digital twin. Through Artificial Intelligence (AI) and Machine Learning (ML), the digital twin shall make use of real-time data from IoT sensors to virtually detect the performance of equipment, how it is operating, and when it may require maintenance. It shall potentially enable remote operation and troubleshooting, reduce energy and water wastage, enable examination of the causes of past issues or breakdowns, and, lastly, provide opportunities to predict future performance or failures to support preventative maintenance.

**PROBLEM STATEMENT**

How might we intelligently manage and perform preventive maintenance of equipment and machinery in our construction and pre-fabrication facility?

**WHAT ARE WE LOOKING FOR**

A prototype solution to digitise physical assets onto a digital platform that enables optimal uptime of ICPH factory facility. The solution should:

- Be able to work with industry-compliant software and share information on the BIM, as necessary using standard APIs.
- Solution must demonstrate reduced need for manpower and increase overall productivity in the facility equipment management.
- Be applicable to most equipment and machinery in the ICPH factory.
- Design with an interface that is easy-to-use for workers on site.

There are no restrictions on the geographic location of the problem solvers who may choose to apply to this challenge. However, the prototype needs to be demonstrated in Singapore.

**POSSIBLE USE CASE**

A dynamic virtual representation of the physical assets in the ICPH or a digital twin is developed through the integration of BIM and other digital information. Through Artificial Intelligence (AI) and Machine Learning (ML), the digital twin receives real-time data from IoT sensors to virtually detect the performance of equipment, how it is operating, and when it may require maintenance. It shall potentially enable remote operation and troubleshooting, reduce energy and water wastage, enable examination of the causes of past issues or breakdowns, and, lastly, provide opportunities to predict future performance or failures to support preventative maintenance.

**WHAT'S IN IT FOR YOU**

- SGD 30,000 of prize money for each winner of this challenge (see Award Model)
- Co-innovate with a leading construction developer.
- Potential to commercialize the solution with Soilbuild, and bring the solution to other sites.
- Be associated with BCA's Built Environment Accelerate to Market Programme (BEAMP)

**EVALUATION CRITERIA**

The Applicants shall be evaluated in accordance with the evaluation criteria set out below.

| Solution Fit | To what extent does the proposed solution address the problem statement effectively? |
|---|---|
| Solution Readiness | How ready is the proposed solution to go to the market? Is there any evidence to suggest capacity to scale? |
| Solution Advantage | If the solution is truly innovative, does it make use of new technologies in the market, and can it potentially generate new IP? |
| Company Profile | Does the product have user and revenue traction? Do the team members possess strong scientific/technical background? |

**AWARD MODEL**

30% of the prize money will be awarded to each selected finalist at the start of the prototype development process, with the remainder 70% to be awarded during the prototype development process, based on milestones agreed between Soilbuild and the solver.

Note that a finalist who is selected to undertake the prototype development process will be required to enter into an agreement with Soilbuild that will include more detailed conditions pertaining to the prototype development.

**DEADLINE**

All submissions must be made by **5 June, 1600 hours (SGT/GMT +8)**. Soilbuild and IMDA may extend the deadline of the submission at their discretion. Late submissions will not be considered.