# Ecava IGX's 3-in-1 Manufacturing Automation System

## How It Started

The involvement of SCADA in manufacturing industry is nothing surprising nowadays. Such involvement can be acquisition and observation for processes, controlling production operations, managing pre-process setups, power monitoring, data assessment, and etc., or in short, the manufacturing automation. And guess what, Ecava IGX can achieve all that for the entire factory in one single configuration file, with less than 2 MB file size.

Georg Jordan is one of the many manufacturing organizations originated in Germany, and has a subsidiary in Malaysia. Back in year 2014, Georg Jordan Malaysia intended to automate their industrial ovens operation, and thus Ecava IGX was brought in to provide the solution. Note that Georg Jordan Malaysia is producing insulators for multiple purposes such as electrical usage.

## The Kickstart and Challenges

So the project kickstarted with industrial ovens monitoring and control system. Everything is installed based on the design, in which there are total of seven (7) PLC (Siemens S7-1200) addressing to each oven, meaning 7 PLCs for 7 ovens. SCADA supervisory by Ecava IGX is connected via Ethernet to all the PLCs, talking to each other over Profinet protocol. Georg Jordan requested the SCADA to manage their ovens with the following basic functional scopes:-

- Input pre-process setting parameters into the system (eg. time period for particular oven to produce a batch of insulator products)

- Control operation (start/stop/abort, etc.)
- Temperature and oven status monitoring
- Alarm
- Trend / graph
- Reports (per process and per day)



*One of the many ovens used to heat up material mixtures to produce end products insulators, in Georg Jordan, Selangor, Malaysia.*
*Note: Its appearance may seems harsh, but it shall be due to the high temperature tough environment. They can function well without any doubt.*

These requirements are satisfied during the first phase of the project. But the happy times hit the intense moment when an issue occurred. The SCADA server machine which located nearby the high temperature ovens often bumped into overheating issue and automatically shutdown itself. However, the solution is easy, Georg Jordan agreed

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to shift the server machine to a safe and sound server room with sufficient cool air ventilation. In fact, such approach shall be taken earlier as practically any server machines shall be placed in proper server room.

## Ecava IGX furthers the impression by extending more automation operation

The project carried on to the next phase, the automation of mixers. These mixers' role is to prepare the compound mixtures before sending them to heat process in the ovens. Therefore, an additional PLC is configured to handle the mixers' control logic. While Ecava IGX extended its services to append the following functions in the same project configuration:-

- Monitor each materials' weight before mixing (on a weighing scale)
- Control each mixer's operation (start/stop/abort, etc.)
- Monitor each mixer's status
- Alarm
- Trend / graph
- Reports

In order to truly achieve the purposes of automation and convenience for both operators and supervisors, Ecava has decided to invest more effort in customizing the basic configuration to another approach which seldom taken for other projects. Such approach is to integrate with Georg Jordan's existing material inventory databases, and retrieve the required material's formulation. These formulation are required as the comparison standard while performing mixer operation. Therefore, discussion has been carried out between all the parties and Georg Jordan has granted the access for Ecava IGX to retrieve the formulation information, so that operator wouldn't need to input the formulation once again before mixing the materials.



*Digital weighing scale is one of the instruments involved in the mixer automation for material preparation*



*Mixer automation system screen used by operators during material preparation*

## The Hardware / Software:

Server Machine: Hewlett-Packard Server (Intel(R) Xeon(R) E3-1220 @3.10GHz)
OS: Windows Server 2012 R2 Standard

PLC (Programmable Logic Controllers): Siemens S7-1200
Protocol: Profinet

SCADA: Ecava IGX
IO tags: ~800 tags

Database: Microsoft SQL Server 2012 Database

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The second phase completed with the mixers automation up and running. But still, it is not the end yet. Georg Jordan continues to extend the requests to rely their entire production line's power monitoring on Ecava IGX. For this task, Ecava IGX is responsible to guard the power usage in Georg Jordan's production site. Anything unusual will trigger and display the alarm on front-end HMI screen, for example high voltage, power limit exceeded, etc.
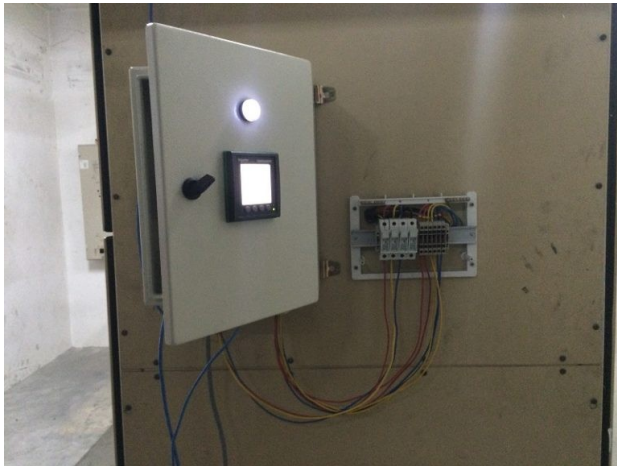


*Additional panel is being installed to integrate the existing power supplies system with Ecava IGX power monitoring system*

Generally speaking, manufacturing automation has grow to such an important extend where hardly any factory doesn't implement it. After summing in the power monitoring, now Georg Jordan's insulator production can be operated in the automated way by depending on Ecava IGX's 3-in-1 manufacturing automation system.