mySCADA

Heavy Clay / Ceramic industry

REFERENCE
2019

INTRODUCTION

KEBE S.A. is a Greek Heavy Clay production company with more than 80 years of experience, leader in the Greek market and with a significant presence in the Balkans. KEBE's production is focused on high quality clay blocks and roof tiles satisfying the needs of 25 countries in Eastern Europe, Middle East, Asia and Africa.

KEBE's main facility in Nea Santa, Kilkis is a totally automated factory that started the operation in 2008. The facilities are extended on a surface of 230.000 m^2 with structured area of 56.000 m^2 and 3 production lines.

Capacity of the production:

- Clay blocks: 2 000 tons per day.
- Roof tiles: 200 000 pieces per day.
- Roof accessories: 15 000 pieces per day.
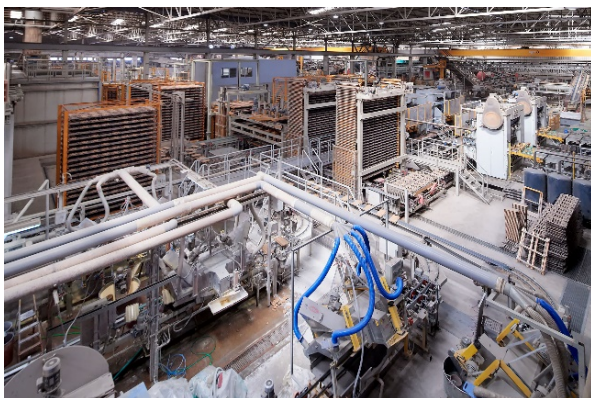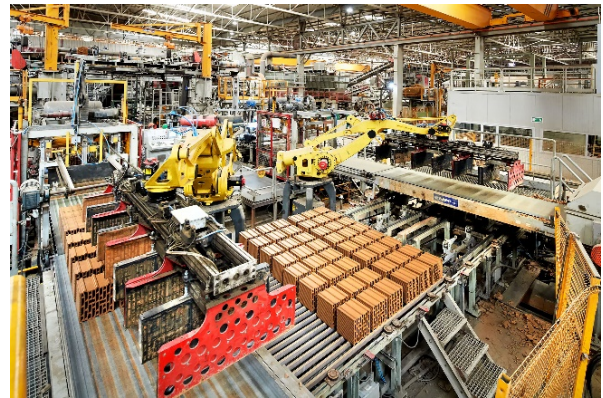
ABOUT PROJECT

The process of producing heavy clay products includes many long-lasting stages. From the moment clay arrives at the factory, 15 days are required for the final product to be produced and stored. During these days the products go through many stages with variable conditions and the final product's properties are directly connected to these conditions.

Griding   Extruding and formating   Drying   Firing

Picture 1 – Scheme of production

The whole process of the production is automated with minimum human interaction and fast information flow. This creates the need for the real time data extraction from the **production** and the **machinery condition**. In 2016 we have implemented mySCADA as our main SCADA solution for production visualization, alarm notification, power quality monitoring and production recording.

All the machinery and PLCs are connected to the local network with ethernet and mySCADA is installed on a server with access to all of them. The project is organized in 4 main sectors and sub-views:

Production overview: Real time visualization of the production

- Main production parameters
- Real time energy consumption
- Online alarms
- Factory overview

Energy: Electrical and gas consumptions for each line

- Real time energy consumption
- History of consumptions
- Trends

Processes: Real time overview of the processes (grinding, drying, firing)

- Trends and historic data of the processes
- Graphical visualization of the processes and traceability

**Mobile:** A simple version to overview the most important information

- Main production parameters
- Online alarms
- Alarm history

Except the accessible views the project has 2 more functions:

- A server-side script that automatically records power data to our main Operational Management System.
- Alarm notification via email for about 2000 remote alarms.

PROJECT - VISUALIZATION

The Factory overview visualizes the whole production. The icons on the left are buttons for the submenu. You access the main screens from the view sector on the top and each sub-view is accessible with these buttons. For example, this is the "Production overview" sector with 4 sub-views (production, energy, alarms, factory).
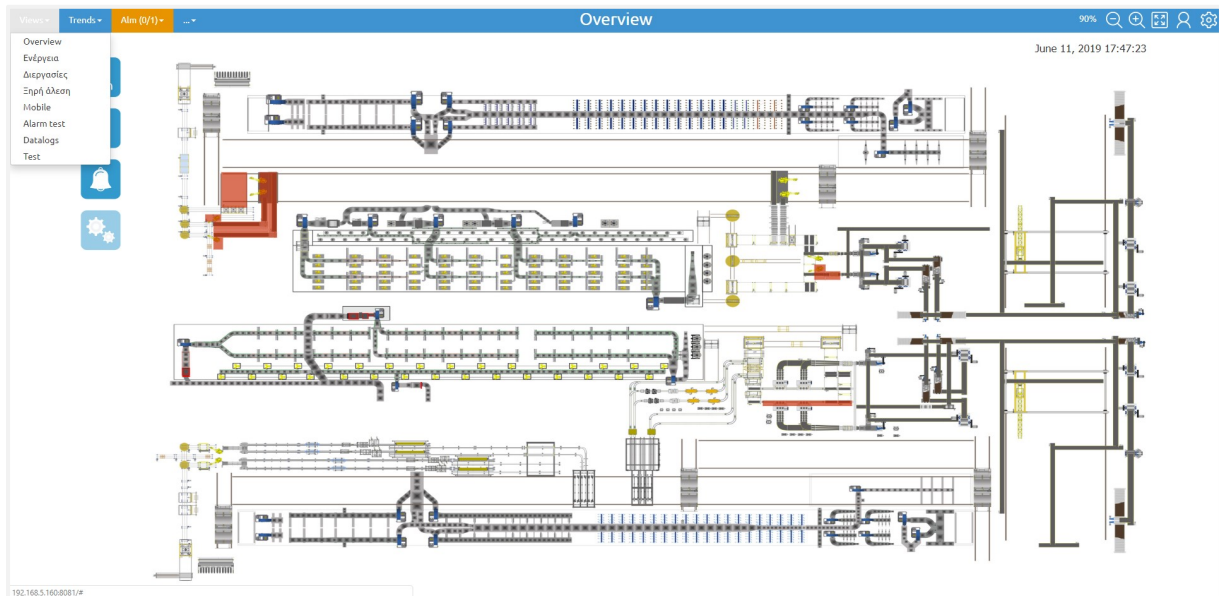

Real time information for the production. On This view we present production time and quantities of the last day and real time values of the most important processes. The graph below is a "chart.js" implementation for visualization of the drying process.
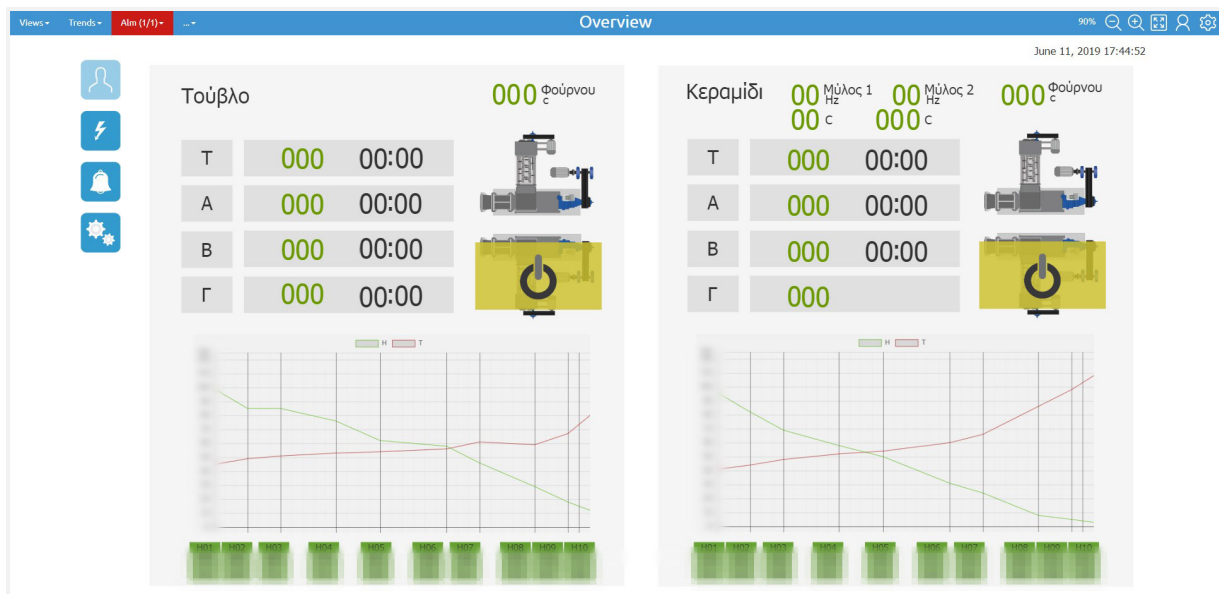
Pop-up window for a specific area. In the "Factory overview" , you can easily check which line operates and which is standby. By clicking on each separate sector, a pop-up window opens with real time details about this sector (machinery status, production values etc.).
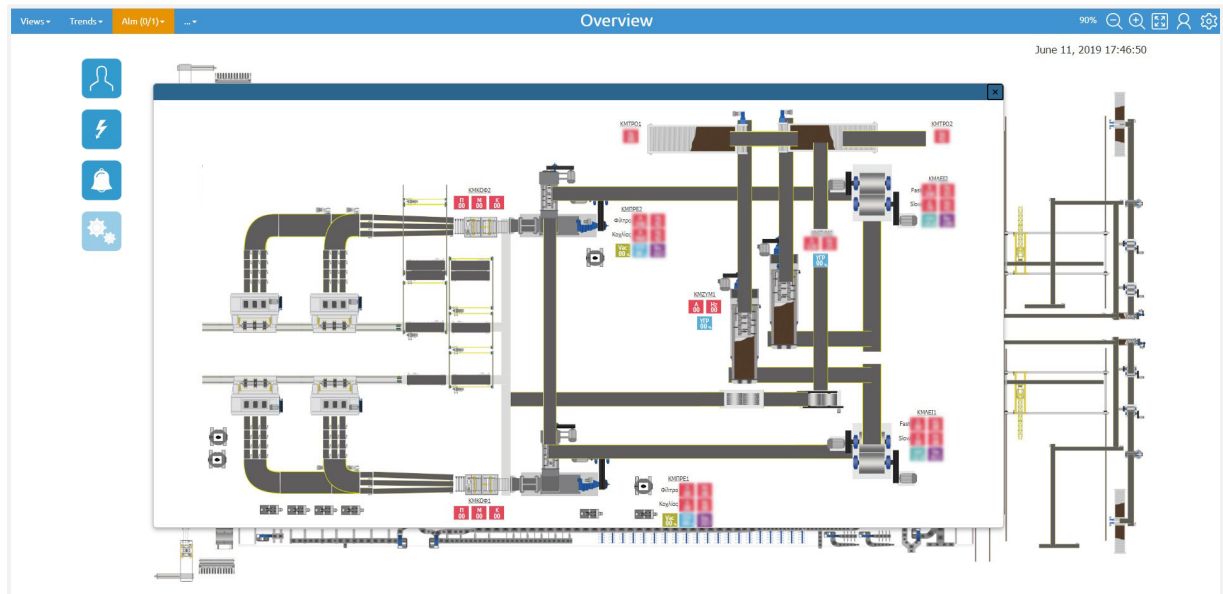

Trend for energy parameters with 100ms circle. We use 3 energy trends and datalogs (100ms, 1min and 15min) depending on the resolution we need and period we want to study or check. This way we can easily capture and study a voltage drop event or analyze the factory consumptions for the last years.
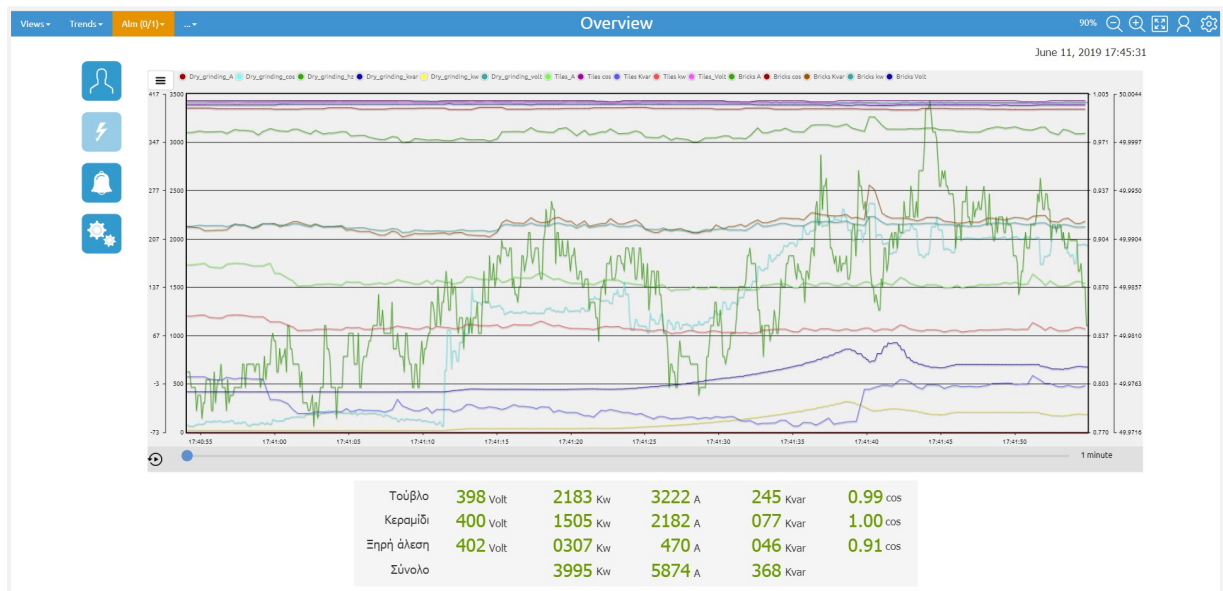
Energy consumption view. With a small script we open multiply datalogs and calculate the factory consumption for a certain period. On this view you can see recorded data from energy datalogs, real time values directly from the measuring units (active energy, reactive energy, natural gas etc.) and calculated totals and averages for a day of production for each line.
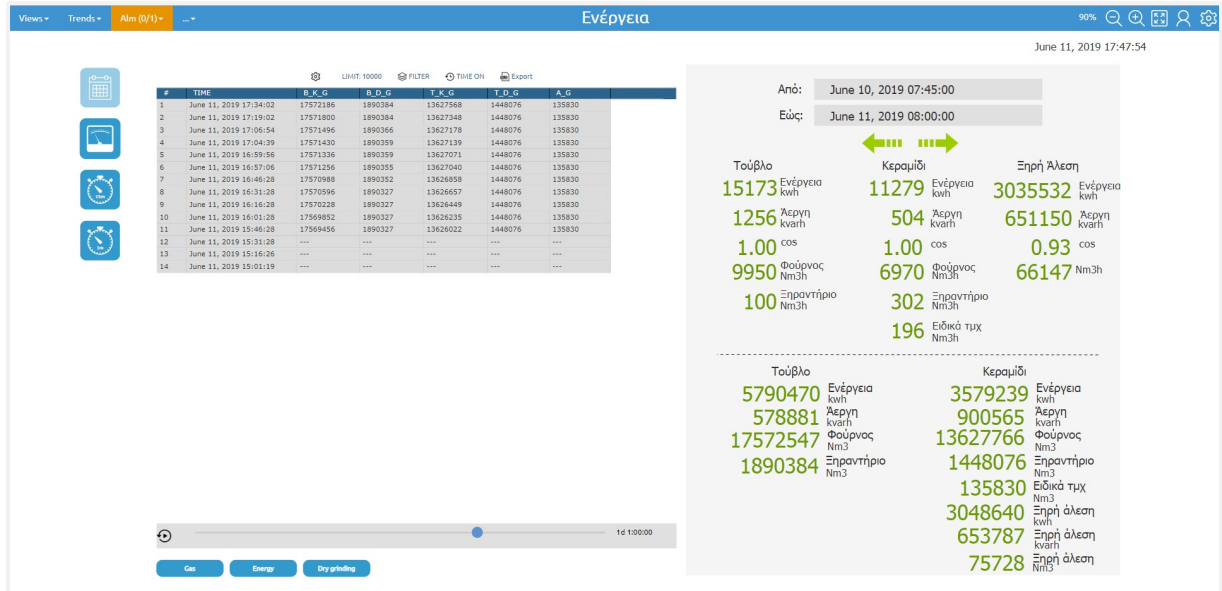
Real time process visualization. This view is connected in drying process and presents information about the status of the machinery (power, velocity etc.), recipe's and real time values of the process.
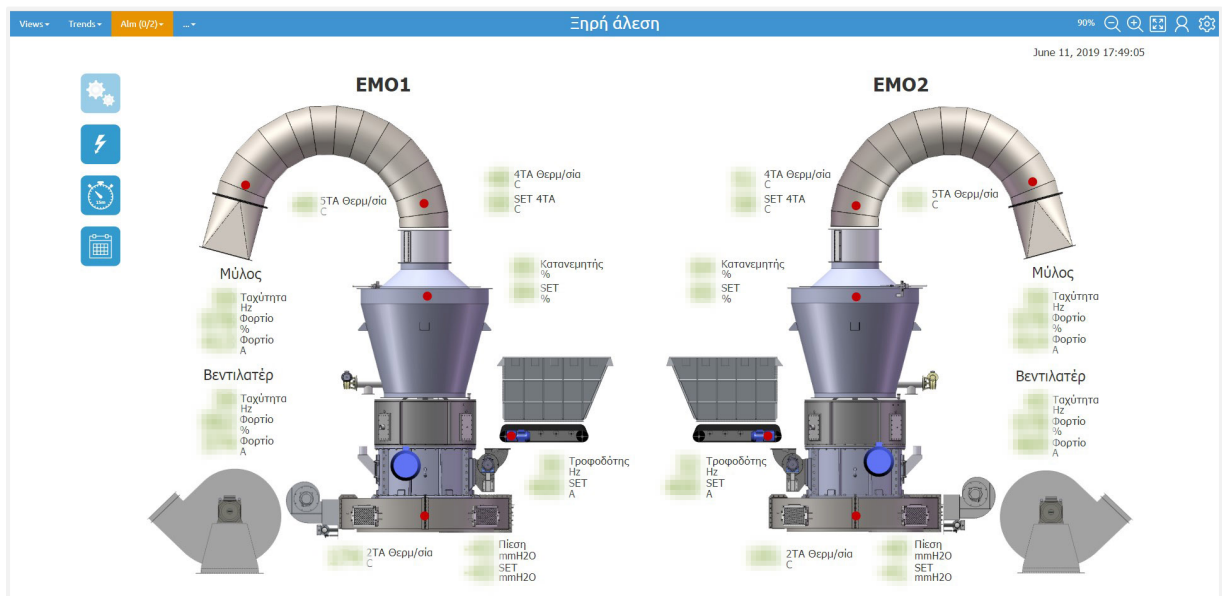
Real time representations of the firing process. In this view we use a callback function that prints records from datalog to the graph. On this graph you can compare recipe's, real time and historic date for the firing process. The buttons on the left are for trends, datalogs and graphs for each of the drying/firing process.
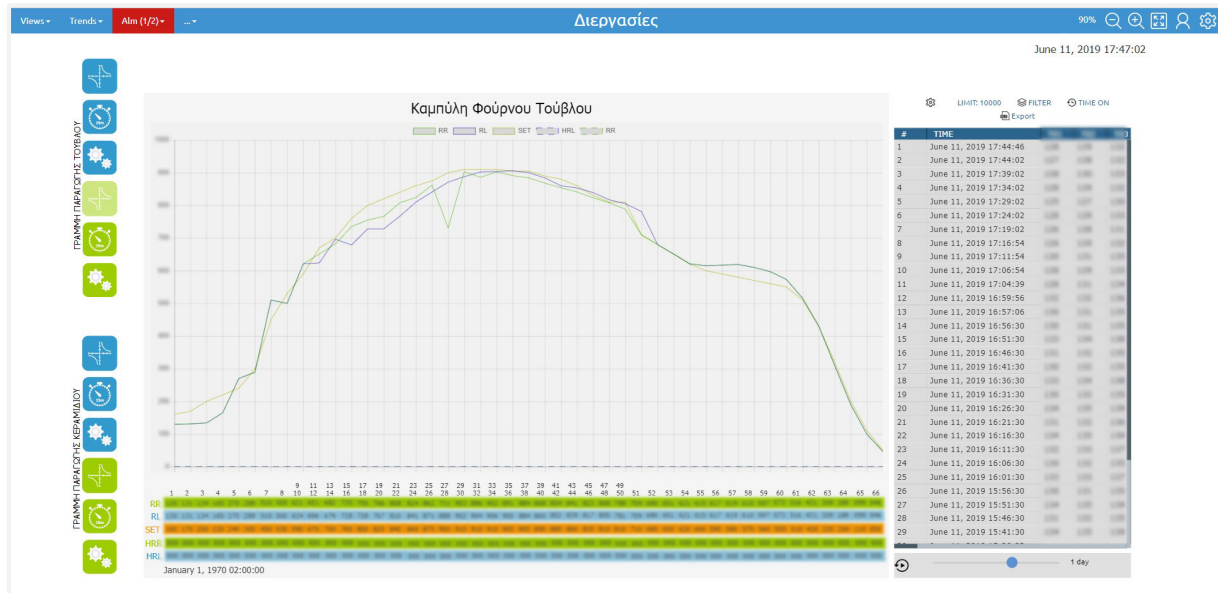
ADDED VALUE

- Fast notification of remote location's alarms reduces the reaction time and unnecessary movements inside the factory. Due to the production process, the factory operates 24/7 with no pauses or intermediate stocks. That means that every unscheduled pause is "dead time" for the production. Alarm notification with a mobile device help us to evaluate the machinery status and prioritize our actions before a visit to the location. By this way we reduced unnecessary movements and the dead time by around 7%.

- Recording the power consumption and the production's information replaced a time-consuming daily procedure to collect and transform data and minimize the mistakes. Furthermore, recording the power and the production numbers in hourly basis helps us precisely calculate specific consumptions and define the best operational technics. The drying and firing processes are taking place inside tunnel kilns 200m long with duration several hours. The processes demand high accuracy and each step should be perfectly balanced (energy and mass) to each other in order not to waste heat. With historic data we can better predict the behavior of the kilns and schedule the production batches in way to reduce the heat loose during the transition between the different products. This reduced the power consumption during a transition by 10%.

- The power quality recordings in ms bases (~100ms) help us define and secure the factory from power failures.

- Finally, the fact that we are able to collect data and connect them to the final product help us improve our traceability and connect the quality control with recorded data from the production.

CONCLUSION

mySCADA gave us the opportunity to easily develop inside the company a SCADA solution suiting perfectly our needs with minimum training. Connecting PLCs to the server and connecting the SCADA server to our Operational Management System is very easy and gives us the opportunity to continuously expand our system. It is very important for us that a non-technician can design views and reports according to their needs and easily have access and transform the Incoming information.

At this moment we mainly visualize or record information from the production. After integrating all the main alarms and parameters of the factory, we will establish a complete tracking system connecting the final product to production information of several days and create reports for each process. Furthermore, we will implement a quick export to CSV button in each view we represent datalogs and a big amount of data.

Finally, the plan is to use mySCADA as our main platform and embed our Operational Management and Reporting System to it.

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