Rehabilitation Project in the Philippines

Mark Yseboodt, and Thomas Walther, Siemens AG, Germany, outline the process involved in rehabilitating a disused line to meet market demand in the Philippines.

Introduction
In the next three to four years, several forecasts indicate that a huge number of new cement plants will be built worldwide. The cement industry is facing drastic changes, which will arise as a consequence of the rapid expansion in production capacity.

The Philippines belong to the emerging markets, where major international cement producers have played an important role for many years.

Cement consumption in the Philippines over the last six years has been quite stable (approximately 12 million tpa). Due to the rise in private residential construction, it is anticipated that cement demand will pick up soon.

Several new cement projects have already been announced in the Philippines, as well as the modernisation of existing plants. The proposed plants include a fully integrated cement project with its own quarry. This plant will utilise an energy efficient dry process method that will employ all the latest and most modern equipment designs to ensure optimum, safe and environmentally-friendly operations.

According to international studies, there are several plants in the Philippines and worldwide that require thorough modernisation or at least expansion to keep them competitive in the market. This means that the topic of migration, especially with regard to process control, is becoming increasingly important to plant operators, since migration generally means the staggered transition to a new technical generation.

The main aim of a strategy for successor generations is always the same: the existing installed base must be modernised stage-by-stage without the failure of the system, without plant shutdown and with minimum loss of production. At the same time, where possible, not only the valuable know-how of the operating and maintenance personnel, but also any previous investments in hardware and application software must be protected long term.

The right way for a migration is a stage-by-stage strategy where plants are not simply “gutted”. The individual activities are kept separate from each other and therefore allow individual steps to be skipped in some cases. It is also possible to put individual building blocks together in a package.

The Philippines cement industry is dominated by three major players: Cemex Philippines, Holcim Philippines and Lafarge Cement Services Philippines Inc., which are local units of foreign cement companies.

The challenge
Holcim is one of the world’s leading suppliers of cement and aggregates. The Group has majority and minority interests in more than 70 countries on all continents and employs some 90,000 people. Holcim Philippines, Inc. operates four major plants – one in La Union, another in Bulacan, a third in Davao City and the Lugait Plant in Misamis Oriental.

The Holcim Philippines-Davao plant services most of the markets in the Southern and Central Mindanao, AARMM and export markets. Strategically located about 960 km south of Manila, the plant has three lines with a combined clinker potential of 5760 tpd.

In order to meet market demand in Southern Mindanao, the company took the vital decision to rehabilitate line 2, a project that had been mothballed since 2000. A careful study and evaluation of the conditions of the line was undertaken with great emphasis on safety and time. The company faced the challenge of putting the line back into operation at minimum cost in the shortest time possible.

The solution
The use of fieldbus communication was a better option than the original plan to connect the MCC and the field instrumentation using the existing technology via the PLC junction boxes.

Given the need for time efficiency and for cost savings in the areas of cabling, testing and loop checking, the company decided on the MCC option. Using the SIMOCODE DP, the normal two to three day completion time for one MCC design was reduced, and the system was able to complete two MCC designs per day. For the field instrumentation, using the Profinet PA was more cost effective than the traditional 4 – 20 mA wiring, and provided a large number of diagnostic features.

The PCS7 process control system
When looking for a new control system, Holcim Philippines investigated the possibilities offered by fieldbus communication, and awarded Siemens the contract to change the existing control system for...
Intelligent motor control centre (MCC)  
The decision to replace the conventional MCC with the SIMOCODE DP was a major turnover in the installation. It simplified the motor control, thus saving time while achieving the uncompromising motor protection features that it promised. A total 156 SIMOCODE DP was installed, replacing the conventional MCC. SIMOCODE meets all requirements for future-proof energy management and offers advantages in all areas from process management, to operation management and switchboards. It provides an open communication via Profinet that makes it very easy to integrate into the process control system. With innovative software, which is part of the Simatic PCS 7, a user-friendly parameterisation, diagnostic, operator control and visualisation is possible. With the predefined CEMAT function blocks, it is very easy and comfortable to integrate motors into the process control strategy of the cement plant.

Process instrumentation  
Field instrumentation Profinet PA provides advantages such as easier and faster cabling. This type of communication, in addition to the cost effectiveness it offers, has a large number of diagnostic features that allow the unit to provide detailed information about the conditions of the instruments due to its physical measurement. For example, the Siemens pressure transmitter Sitrans P DS III has a number of integral diagnostics and simulation functions that permit users to specifically assess the status of a device during commissioning, servicing and maintenance. Preventive maintenance is supported by functions such as:

- Operating hours counters for measuring capsule and electronics module.
- Event counters for limit violations.
- Minimum/maximum pointers for pressure, sensor temperature and electronics temperature to record process extremes.
- Two freely-configurable timers that can generate a warning or an alarm when a set value has been exceeded.

Simulator functions are additionally available for checking the configuration of the transmitter and the controller input for intended functionality. These also contribute toward fast and specific troubleshooting and thus towards an increased maintenance efficiency.

Measures can be derived from a combination of the above mentioned functions that contribute towards predictive maintenance and thus increase the plant availability and help increase productivity.

The advantage of providing this information in addition to physical measurement is that you can plan the maintenance well ahead and only when it is necessary. The instrument warns the operator in advance when it needs maintenance, according to the condition of the instrument.

Another big advantage is that in case of the instrument breaking down, it will not only tell the operator that the instrument has failed, but it will communicate which part of the instrument has broken down. This reduces the troubleshooting time and allows the service engineer to take the correct actions. For example, if an instrument broke down because the temperature was too high, the service engineer would be informed that the temperature problem has to be corrected in order to minimise the risk of it happening again.

Due to the importance of preventive and predictive maintenance, Siemens is now offering diagnostic features in a large range of process instrumentation. Not only pressure transmitters, but also other instruments like valve positioners, gas analysers, level switches and the “cement radar” Sitrans LR400 have these features included.

CEMAT is optimised for integration of distributed field devices into the process control system. The Process Device Manager (PDM) software, an integrated part of Simatic PCS 7, allows easy parameterisation and optimises the handling of the field devices. With Simatic PDM, one software programme can be used to configure a number of field devices by different manufacturers using a single user interface. Process device data can be easily set, changed, checked for plausibility, managed and simulated.

The result  
The objective to finish the project within the specified time frame was made possible by choosing the Profinet approach. In less than the target number of days, line 2 was brought back to life and started to produce clinker by the end of April 2006.

It was a breakthrough in the process of installation and maintenance. The time it took to install and commission the PCS7 was considerably shorter than the old control system. The company realised that it was important to invest in innovation in order to achieve its cost savings and time efficiency targets.

The application of bus communication in process control was the key tool in beating the deadline set by management. Though the technology of this type of data acquisition was long available, it was in this undertaking that the company realised how fast and easy the installation and commissioning of each motor control was. The author was directly involved during one of the upgrades of controls in the plant from relay to Simatic S5. Cabling works accounted for much of the work, including the loop-checking of the cables to ensure that cables were correctly terminated. The disadvantages of this type of system are already identified (CPU error, static voltages and electromagnetic interferences etc.); these have already been addressed by proper installation and cabling. Profinet has allowed Holcim to cut the installation costs drastically (Figure 2).

In the meantime, now that this line is up and running, the company is planning for the automation of the new line 3. Profinet will be the preferred choice for the new control system. Holcim and Siemens are already in close coordination to ensure that this new line will be put into operation as soon as possible. When this line is finished, it will be the most advanced cement production line in the country.