



Modular milling concept

Ocrim's innovative approach

by Ocrim's Technological and Communications departments

Providing routine maintenance in a mill plant while reducing production costs is an issue that those who experience working in a mill are faced with daily. Moreover, the ambition to get ever larger and better-performing plants, as well as making the most of the economy of scale while continuing to manage one's everyday life and work practices in a simple way, is one more challenge that has led Ocrim experts to provide solutions that can fully meet these kinds of requests.

Nowadays, in many countries of the world, there is indeed a trend towards establishing increasingly higher capacity plants, which can be easily implemented with today's cutting-edge technologies.

A long time ago, talking about mills with a 500-tonne-per-day (tpd) capacity seemed more like a pipe dream. Today, with a view to meeting large production requirements in various areas of the world, Ocrim can design and manufacture 1200 tpd capacity plants.

This trend is definitely justified by lower initial capital expenditures (CAPEX), with respect to the same potential being obtained in several sections. As a matter of fact, the cost per

tonne of a plant will decrease as its capacity increases, since all plant equipment can be optimised, thus avoiding any "potential waste."

However, the benefits related to energy consumption savings and the use of human resources are very important. Indeed, just think that the same number of people can control and manage a 400 tpd plant as a 1000 tpd one.

A plant of this size, even if equipped with current technologies, may clearly exhibit some limitations if a whole series of management aspects are not taken into account in advance. Let us think, for example, of downtime periods due to both routine and extraordinary maintenance.

If we consider the cost of a downtime period in a 1200 tpd mill as a result of lower production due to scheduled maintenance e.g. in sifters, or for replacing grinding rolls, the impact that this can have on the plant's annual financial statements is immediately clear.

To solve this kind of problem, while at the same time ensuring compliance with maintenance requirements according to planned intervals, Ocrim has developed the "Modular Mill Concept."

This truly innovative technology makes it possible to stop some parts of the grinding section and leave some others running, thus steadily ensuring some production. The benefit derived from this

is obvious and easily definable.

The first benefit can be found at a production level, when downtime is planned and/or necessary. In this case, production, even if reduced, is still guaranteed. As a matter of fact, this technology makes it possible to recover at least 50 percent of production during planned and/or unexpected downtime in the grinding section.

A second benefit can be found in terms of maintenance in the grinding area, which today must be stopped before performing any work. Maintenance is actually very often sacrificed for the benefit of production. By applying this technology, maintenance intervals and methods can be observed, as the impact on production is very low.

We all know that a properly serviced plant is more efficient and productive, so all solutions ensuring sound, effective maintenance are always welcome.

But what is this technology based on? And how is it implemented?

There are four main features of this solution:

- 1) Diagram
- 2) Layout
- 3) Automation
- 4) Equipment

1) Diagram: Right from its infancy the diagram must be designed in such a way as to be divided into separated sections that are able to run independently. It is also essential that these choices do not affect the quality of the finished





product, whether the grinding section is running full load or half load. To achieve these results, Ocrim millers' experience and expertise are essential elements;

- 2) **Layout:** To implement a modular concept, plant engineering plays a key role. Distributing loads and properly positioning the various machines are major steps towards implementing what is provided for in the diagram. This can be achieved only thanks to comprehensive knowledge of the material to be processed and the applied technology;
- 3) **Automation:** Without wishing to belittle the other aspects, this is possibly the most important element for the success of this technology. Knowing when (and what) to stop in the grinding section depending on various circumstances, makes it possible to limit unnecessary downtime and, above all, to always rely on a running part of the section. The advantage of being able to develop in-house management software and to be always in contact with millers, who will then use it for their plants, makes it significantly easier to identify a wide variety of key logics for proper operation;
- 4) **Equipment:** All this would not be possible if machines such as roller mills could not communicate with the central management system and receive inputs from it about what to do in case of alarms in the grinding section, and/or simply in the event of partial scheduled downtime. Furthermore, machines will also have to include a wide range of safety devices in order to prevent potential accidents when they are accessed for maintenance operations, considering that a part of the plant may be running.

In principle, this technology can also be applied to preexisting plants, and thus be used to retrofit them.

Clearly, a careful analysis is needed to get an insight into, in particular, the condition of preexisting machinery and the level of automation applied, along with a thorough evaluation of the plant engineering in order to see if and which points will need to be modified so as to be adapted to this new technology.

Nowadays, there is a lot of talk about Industry 4.0 and how to apply this concept to the milling industry. Ocrim's "Modular Mill Concept" is definitely a tangible example of Industry 4.0 intended for milling, since a plant operating independently and observing downtime periods as scheduled without jeopardising its whole production can only be defined as such.

In conclusion, taking those plants that already use this technology as reference points, we can say that the total downtime due to planned and/or unexpected maintenance, as well as occasional idle periods in the grinding section, has been reduced by 30 percent to 50 percent, with respect to the values recorded for situations without the modular concept. This means that this technology could entail major economic savings, at an OpEX (operating expense) level, in any plant.

In view of these results, applying the modular concept technology to plants with a capacity exceeding 600 tpd has become a well-established practice for Ocrim.

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