

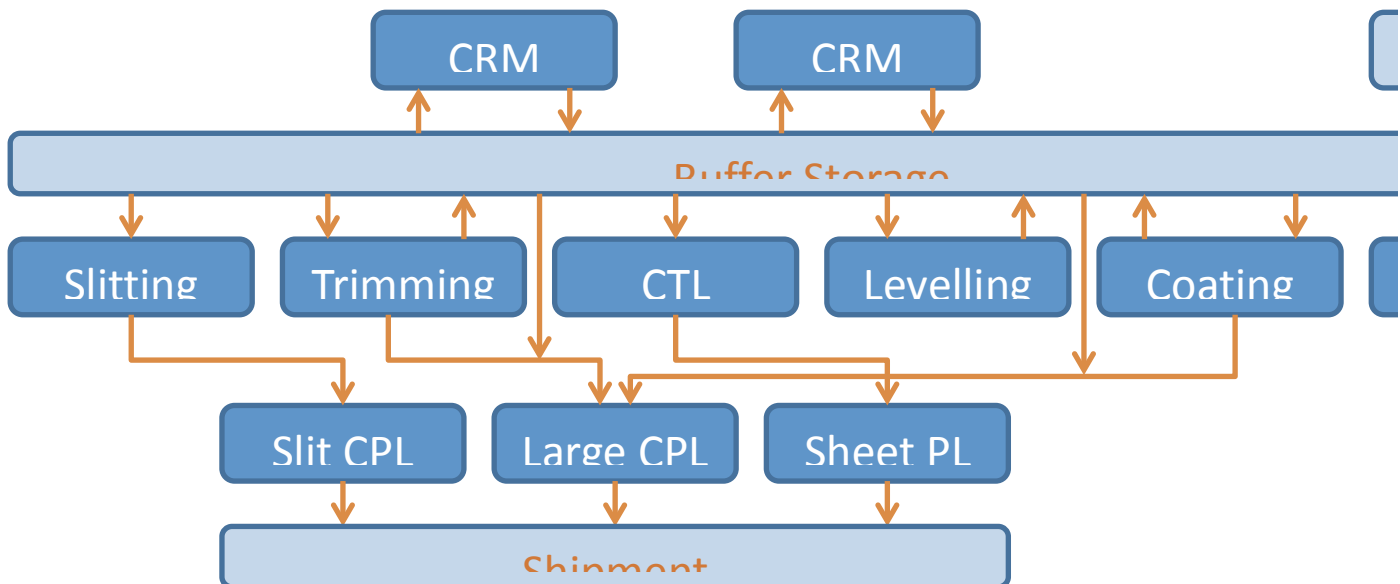
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Pesmel Flow How - New approach for shortening lead times in aluminum production Pesmel Flow How—铝产品生产中缩短半成品滞留时间的新途径

Pesmel Oy is the pioneer in industrial factory logistics. In aluminum mill complex the production includes different processes built by various suppliers. However, the total efficiency is very much dependant on how well these processes are connected to each other and how we manage the daily manufacturing operations. Pesmel 是工厂物流解决方案的供应商。复杂的铝产品生产工艺需要许多来自不同供应商的设备，如何将这不同的设备有效地协同工作，往往会决定整个工厂的总体效率。

The key for this is the coordinated material and information flow throughout the entire production cycle. And this is obtained by connecting internal logistics devices seamlessly with process equipment for faster production cycle.

提高工厂总体效率的关键是在贯穿整个生产链中协调物流和信息流，通过将物流设备和生产线无缝连接，这种协调即可实现。



Example of a flow chart in an aluminum mill

铝板带生产物流范例

Building an efficient production structure starts from simulation. In simulation study the mill lay-out with production processes, automated warehouse, packing and internal logistics is simulated with different demand scenarios to optimize and verify production efficiency and delivery capability. Simulation study specifies the needed equipment and gives guidelines for control system.

建立一个有效的生产架构从仿真试验开始。在仿真试验阶段，我们根据不同生产需求，让生产线、自动仓库、包装和物流设备进行仿真运行，以确认系统配置的效率和产能。通过仿真试验，我们可以决定对设备的需求，并指出控制系统的设计方向。

The equipment implementation is executed according to the simulation study either to an existing mill or to a new mill. Simulation study for existent mill ensures the usage of existing equipment as far as possible. 系统中配置的设备可以上新上设备，也可用已经存在的设备，仿真试验可以确认现有设备的可利用程度。

Control MOM (manufacturing operations management software) supports the information flows in manufacturing operations optimizing the use and control of different processes. Control MOM includes all the needed control levels:

Control MOM(制造运行管理软件)支持制造运行管理过程中的信息流，优化控制不同生产线的工作，它涵盖所有必要的控制层级。

- level 3 Manufacturing operations management
L3 制造运行管理
- level 2 Monitoring and supervisory/automated control
L2 监控自动控制
- level 1 Automation
L1 自动控制

Total efficiency can be obtained only with fully integrated control system including all the control levels.
将这些控制层级完全集成起来，可以成就很好的工厂运行效率。

The control MOM includes the following functions:
Control MOM(制造运行管理软件)具有以下功能：

Production planning: Optimize cost savings and sustainability by scheduling the most resource consuming production phases by weather conditions or electricity spot prices from the Internet.
生产计划功能：根据不同的条件优化排产，例如依据消耗最大的生产环节，或天气或用电低谷时段。

Production execution and tracking: The customers can see in real time the status of their order in your production line. The plant director can see the latest production yield reports on his sofa, on an iPad for example.
生产执行和跟踪：客户可实时看到他们的订单的执行情况。生产厂长坐在家也可查看最新的生产报告。

Production control: Yard and warehouse operations are remotely controlled from far distance. Warehouse or yard stock status can be seen in real time.
生产控制：平面库和高架库的运行可实现远程控制，并实时监控。

Maintenance: The equipment can order spare parts and maintenance services for themselves when they need to, before anything breaks.
设备维护：计划维修前，设备可自动发送备件和服务需求。

Quality control: Automated quality data collection and reporting based on your quality plan. Readily accessible to the customers when tracing needs occur.
质量控制：自动收集质量数据，并根据质量计划自动生成报告，当有追溯需求时，可立即查看。

Safety: The operations can be driven determinedly towards a zero accident principle (employees, machines, products) and the progress can be followed. Sick leave amounts, unplanned production downtimes and product defects are minimized.
安全：工厂运行在“0”事故状态下运行（人员、设备、产品安全），安全状态全程跟踪。病假率、意外停机和产品缺陷都可降到最低。

Environment: The actuators can be optimized to work energy efficiently (e.g. feed the dynamic brake energy of regenerative drives back to the power grid). Calculate and reduce the carbon footprint.
环境：执行器都会被优化到最佳节能状态(例如：将大功率电机的刹车电流回馈到电网)，减少碳排放。

In summary, the coordinated material and information flow throughout the entire production cycle is implemented by the following steps:
总而言之，物流和信息流在生产链中的贯穿分三步实现：

1. Simulation study
仿真试验
2. Equipment implementation

配置设备

3. Control MOM (manufacturing operations management software)

配置 Control MOM(制造运行管理软件)

With proper control the lead times are shortened and efficiency increased.

如此以来，半成品的滞留时间缩短，生产效率提高。

