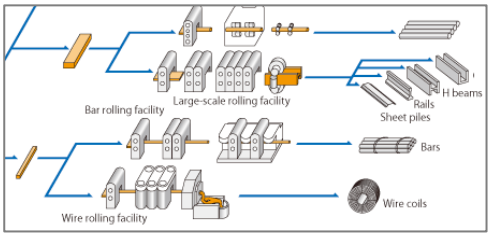
Six Sigma in Metallurgy

Six Sigma is a data driven process improvement methodology based on **DMAIC** cycle (Define – Measure- Analyze – Improve – Control). This methodology can be applied successfully in Metallurgy.

Here is an example of successfully Six Sigma project used to decrease number of ball bearings blocking in stands in a rolling mill. The ball bearings used in stands of the mill have diameters reaching nearly 1 meter, are very expensive and their replacement times exceed 4 hours. The key indicator which give the performance of the process was the down time caused by these blockages (D).



It studied the process (process map), were quantified losses and was established team to work on the project (Define).
In **M**easure were collected data about number ant time of stoppages, stand type, shift, type of lubrication (oil mist or grease), cooling water pressure, ball bearing life time / stand, etc

Identification of factors which influence bearing block was done by IPO (see picture below).
D was influenced by the type of stand (in the vertical stands were blocking the most), cooling water pressure and shift (in the night shift were blocking the most). Using hypothesis testing was demonstrated these possible influences.

Six Sigma Project : Decrease number of ball bearings blocking in stands
Date : 14.02.2017
IPO diagram
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Input	Process	Output
Number of stoppages Time of stoppages Stand type Shift Type of lubrication Cooling water pressure Ball bearing life time	Stand blocking	number of bocks bearing in stands

It proceeds to identify solutions that implemented would eliminate or diminish the negative effects for which it was made the project (**I**mprovement phase).

Were used the following tools: Brainstorming, Poka Yoke. Choosing the most efficient or the fastest solutions were done using Prioritization Matrix help.

Because phenomena appeared only in the vertical stands a ball bearings cooling water protection system was designed and mounted on two of intermediate stands (Pilot Test).

Checking mist lubrication every 4 hours (2 times per shift) and mounting an optical and acoustic alarm in the control room (Poka Yoke) to warn stoppage of mist lubrication station were other solutions implemented. After fully implementation (24 stands), the number of stops due to blocking of the bearings was eliminated. In **C**ontrol phase the work instruction "Preventive maintenance - Cap. 7 Check rolling stands lubrication" was modified.

We invite you to Six Sigma courses organized by Effective Flux to reap the benefits of this methodology.