

# CORRECT TORQUE LIMITATION AND DRIVELINE OPTIMIZATION<sup>1</sup>

Daniel Myrgren<sup>2</sup>  
Paulo Eduardo Chepuck Miazzi<sup>3</sup>  
Sigvard Weisbjerg<sup>4</sup>

## Abstract

Torque limitation is a crucial part of preventive maintenance as well as productivity. Downtime is expensive both from components point of view as well as from lost production. Dynamic behaviour of drivelines make production torque vs. torque limitation even more complicated. It is crucial to have very accurate torque limitation. Limit setting and proper handling is crucial for the performance of the protection. Voith Turbo Safeset has developed its Mechanical friction coupling to a digital-mechanical torque limiter. With digital calibration of the torque limitation coupling, and visual setting instruments, it ensures a very precise setting and handling of the torque limit for your driveline for full protection. The system also enables you to follow the last setting changes, as well as on-demand setting status. It is therefore easy to verify that you have the right protection for the drive train. It is possible to commissioning the complete driveline system and re-calibrates the limit setting for the uniqueness of the application and drive behaviour. The unit alarms if there is a faulty torque setting so that no unexpected productions stops occur, or unwanted overload systems happen. When the unit has released and protected a driveline several times and it is time for service inspection - the unit gives a signal. In combination with Voith Safeset Driveline analysis, this is the latest generation of driveline optimization on the market.

**Key words:** Dynamic drivelines; Rolling mills; Torque limitation; Driveline design.

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<sup>2</sup> Global Sales & Marketing Manager - Voith Turbo Safeset Sweden.

<sup>3</sup> Sales Supervisor - Voith Turbo Brazil.

<sup>4</sup> R&D Engineer – Voith Turbo Safeset Sweden



## 1 INTRODUCTION

The global society is always striving for growth and increased productivity. The steel industry in general is no exception.

The demands for a drivetrain (existent or new) for the steel industry have increased over the years, making it more complicated. Its design is lead to the extreme, due to reduced safety margin between design torque and operating torque.<sup>(1)</sup> For this reason, torque limitation is important for an optimized driveline design.

## 2 BACKGROUND

A problem that often occur though is that independently of how well designed the driveline is, there is often a degree of uncertainty of the setup of the device. If the driveline components are not set correct, the risk of failure is big.

Voith Turbo Safeset has in its research discovered that the numbers of factors that affect the performance of a driveline protection is many. Training level of the maintenances personnel is the first. Reading and understanding the instruments is another. Calibration of tools is thirds etc.

Is known that Voith Turbo Safeset manufactures the most reliable torque limiting device on the market. If it is not set-up correct, the performance will be affected.

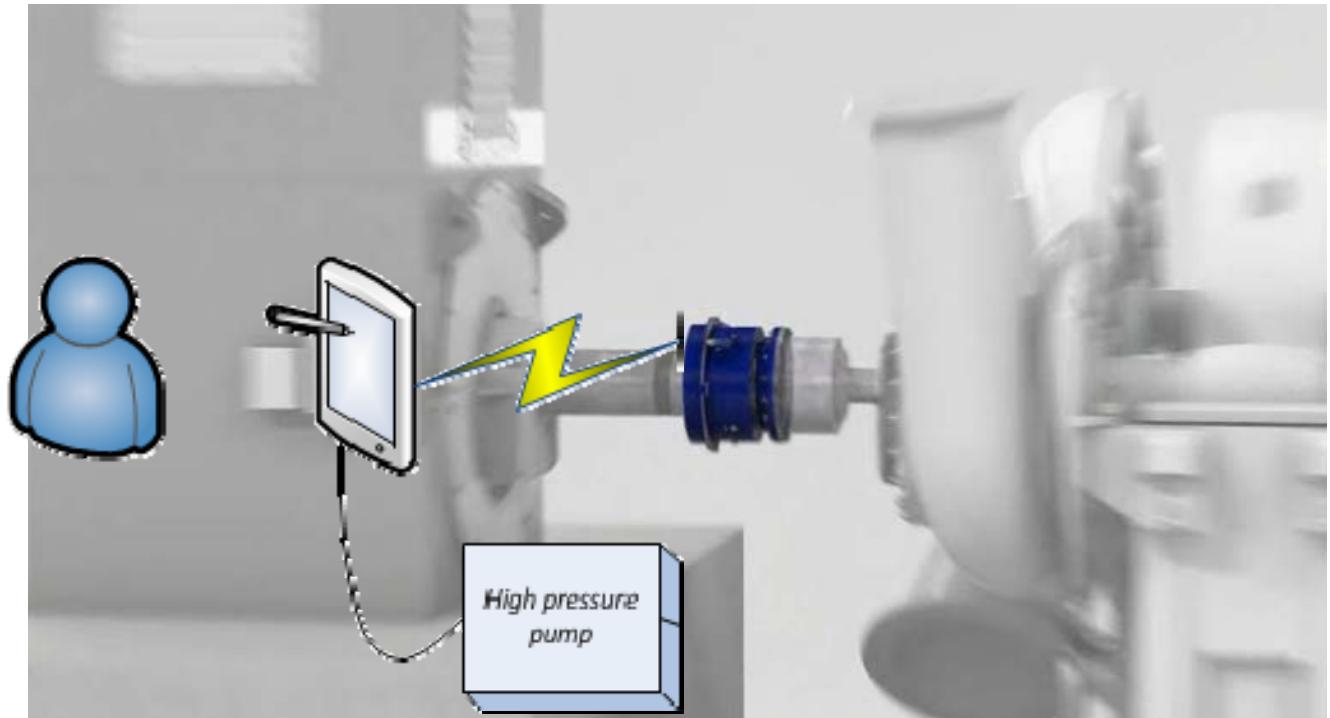
On the other hand, the numbers of Torque overloads are hopefully not that many over a year of production.<sup>(2)</sup> It is therefore hard to expect maintenance personnel that are responsible for a large amount of technically advanced equipment, to understand and be skilled on each and single component in the mill, including mill stands, drivelines, gearboxes, motors, etc.

Looking for this scenery Voith Turbo Safeset has therefore developed an “easy to use” interface that combines the mechanically directness of the Safeset Coupling, with a digital interface that ensure correct performance.

## 3 TECHNICALLY DEVELOPMENT OF MECHANICALLY TORQUE LIMITATION

The technical development in 2000 - century is fast, and the amount of digital interfaces is increasing. We have therefore developed the i-version of Safeset torque limiters.

We use RFID technology to identify and store setting information for an individual Safeset Torque limiter. The Safeset Coupling then communicates with a handheld telephone unit that provide all necessary information about the setting, performance and service intervals of the unit.



**Figure 1:** communication torque limiter, hand held device and high pressure pump.

With a RFID tag and a digital interface you are able to;

- Store unit specific data on the Safeset
- Read and write data from the Safeset
- Exact and easier setting of the torque limit
- Give the customer a service indicator
- Log settings and show history on the Safeset
- Show "How to" animations or video

This development opens up for a large amount of opportunities of driveline developments and optimization of existing units.

It will give the user of Safeset products a clear benefit of total control of the torque limitation of the drivetrain, and overview of all couplings, for all protected drivelines in the same hand held unit.

#### 4 THE INTERNET OF THINGS

The concept of the Internet of Things first became popular through the Auto-ID center and related market analysts publications. Radio-frequency identification (RFID) is often seen as a prerequisite for the Internet of Things. If all objects of daily life were equipped with radio tags, they could be identified and inventoried by computers.

With all objects in the world equipped with minuscule identifying devices, daily life on Earth would undergo a transformation. Companies would not run out of stock or waste products, as involved parties would know which products are required and consumed. Your ability to interact with objects could be altered remotely based on your current status and existing user agreements.<sup>(3)</sup>



## 5 CONCLUSIONS

By combining the directness of mechanical torque limitation with the accuracy of digital interfaces it is possible to achieve a very precise protection to heavy duty drivelines.

A handheld unit with RFID communication to the Safeset gives a very convenient overview of the data for the Safeset, such as Settings, History, Service etc. It minimizes the risk of human error in handling the couplings, and therefore the protection for downtime is also maximized.

The system will be available for all new units manufactures, but also as a retrofit option for existing users.

### Gratefulness

We would like to thanks our R&D and sales teams which supported us all the time providing the necessary information from both customer and product.

Our appreciation also for our customers due to all the support that helped us to develop most of this research and this new product, always believing on our product.

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