Q-SHRED

Shredder technologies suite

BENEFITS

Lower shredder impact on weak networks
Lower personnel cost and transformation cost
Higher machine safety and enhanced process monitoring
Higher process repeatability
Higher spare parts management efficiency

PROCESS

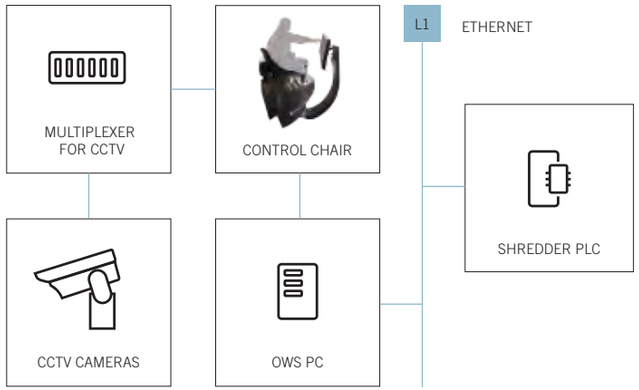
Q-SHRED is a suite of technologies for shredder applications, designed to optimize shredder operation and utilization factors. The technologies implemented range from power system solutions to advanced control and monitoring systems.

Autotransformer starter
Autotransformer technology applied to shredders is a simple and cost-efficient solution to manage the shredder motor starting phase.
The strategy adopted during this initial phase aims to reduce the stator voltage, limiting the in-rush current peak during start-up. This is performed by starting the motor with a lower transformer tap. This application is particularly suitable for small motor sizes and weak networks where a Direct-On-Line solution may be unsustainable or discouraged by the electric energy provider.

Liquid starter control
Liquid starter technology uses a liquid resistor in a variable rheostat, useful for its high power dissipation capacity.
It is thus suitable for the large slip ring induction motors used for shredding applications.
After the starting phase the control system acts continuously on the galvanized electrode position to regulate the rotor current. The control system is fully integrated with the motor drive and the shredder PLC to ensure the proper data acquisition and interaction with the process control strategy.

LV variable speed drive
A Variable Speed Drive (VSD) is a very efficient solution for shredder motor purposes. A VSD controlling a Low Voltage (LV) motor is a valid alternative to a Direct-On-Line Medium Voltage (MV-DOL) system. As a matter of fact, the latter has several advantages:
> Lower impact on feeder line during start-up
> Lower motor stress levels thanks to the continuous torque control
> Safer machine operation: 1 minute vs. 30 minutes for rotor stoppage
> Fully configurable motor torque limit and starting/stopping curve
> Possibility of recovering energy during the stopping phase with a regenerative converter
> No fluid coupling or capacitor bank needed; lower transformer size and maintenance mean reduced initial and operating costs.
The control structure is based on Danieli Automation Process Automation Controller (DA-PAC). Danieli Automation Q-Drive can also be installed on MV motors for high-power shredders.

Q-ARDC automatic reject door control
Q-ARDC system performs the automatic detection of unshreddable material during shredder operation, opening the reject door



when necessary and after the proper delay.
The detection is based on real-time analysis of noise (microphone) and vibration (accelerometer) signals.
A dedicated OWS is used for configuration and diagnostics of the system and no operator intervention is needed regarding the reject door during machine operation.
On the system OWS are displayed microphone and accelerometer signals and signal spectra, useful for fine-tuning the detection algorithm according to machine features.

Maintenance management
Q-SHRED integrates also a maintenance management system dedicated to shredder applications, which features:
> Monitoring of each motor, hammer, casting operating hours
> Centralized data logging and trending for the whole machine
> Data analysis per each production batch
> Process & machine data export function

EQUIPMENT

Q-SHRED technologies are designed to be integrated in a single-point control strategy. As such, the system HMI features a full touch-screen interface for synthetic process data display and quick machine status evaluation. Dedicated pages for material handling and production reporting also are included. A CCTV system is integrated for a more efficient process monitoring and supervision, enhancing process and machine safety. Remote assistance also is implemented for a complete plant diagnosis from Danieli Automation Headquarters and historic/on-line data consultation and analysis.

PLANTS REFERENCE

> Sonasid, El Jadida, Morocco
> African Steel Mills, Ogun State, Nigeria
> Rajhi Steel Industries, Jeddah, Saudi Arabia
> Eurajoen Romu Oy, Eurajoki, Finland
> Mag-Ferum, Nowy Sacz, Poland
> RMB Spa, Polpenazze Del Garda, Italy
> Metales De Navarra SA, Medenasa, Spain
> COMET, Maglie, Italy
> INSUN Ent, Gyeonggi-Do, Korea
> Gomelvtorchermet, Gomel, Belarus
> Novelis, Nachterstedt, Germany