

Gerdau Jackson TN: DC drives according to UL508A and OSHA prescriptions for lock out and arc flash risk reduction

AIC is completing the first step of the Gerdau Jackson TN project, focused on a complete replacement of the Main DC drives for the whole rolling mill stands

Along with these high power control panels, AIC has also designed and developed a state of the art safety solution, in order to allow the operator safe access to the stands for every possible maintenance or repairing activity.

The safety for the people and the environment must be considered as one of the main drivers for every responsible steel producers. That's why AIC always looks for the most suitable solution for safety while keeping high performances of the plants.

The designed solution can combine both safe working conditions and efficient plant performances.

During the engineering phase of this job a safety design applied to North American standards has been required, mixing the deep experience developed together with our European clients in the last ten years, with the different standards adopted by American OSHA. The result is a great solution keeping all the previous milestones in the existing culture but applied in a more modern and efficient way.

From the point of view of the power control revamping, the core of the job are the 17 new DC drive panels, with the best technology available on the market for DC drives; the selected ABB DCS800 drives, will be fully controlled via Ethernet/IP; furthermore every panel has been designed according to UL508A north American regulation, the standard for industrial control panels.

Thanks to its certification for the manufacturing of equipment UL and CSA listed, AIC delivered the whole supply already listed with an official Intertek authorization.



The panels are carefully designed to reduce as much as possible the risk of arc flash with several active protections; two systems were implemented to prevent the risk of arc flash:

- The first one is a system that quickly detects the arc, by sensing the flash, and immediately opens the low voltage circuit breaker and the upstream medium voltage circuit breaker; the system is able to interrupt arc flashes in a time of 30-50ms before they become a short circuit; in this way the arc is instantaneously kept out and the dissipated energy (kA^2s) very low.

In order to reduce the risk of arc flash it is also possible to properly use 'arc-proof' switchgears, but our implemented system offers a different and active protection; in fact most of the injuries happen with the panel door open (e.g. during maintenance); in this case a traditional arc-proof switchgear won't offer the minimum protection against arc flash.

- The second way to minimize the risk of arc flash is based on the remote control of the motorized circuit breakers: each DC drive main circuit breaker is completely driven by a dedicated system, mounted in a different physical position; in this way it is possible to open or close the power supply without any danger for the operators; in case of short circuit the operators are actually "far" from the panel, thus the risk of injury is minimized.

Another important milestone of the safety solution adopted from AIC is the safe stop system, completely realized with a safety PLC; this system controls the safety outputs according to the received safety inputs; redundant inputs, safety logic and double disconnection of the power source assure reliability of the safety emergency stop.

Part of this system is used also to manage the safety access to the mill; the functionality implemented permits to "ask" the system the access to the machine.

The system, according to the production in progress, controls the work process to have a safety stop without scrap; when the "safety state" is reached, a safety solenoid releases a key that can be inserted in a lock box; to exit from the "safety" state is necessary to insert the key back in the trap and give a reset command.

Functional and electrical safety, as well as the attention of the lock out / tag out procedures are the most important targets examined and followed during the whole engineering process; the very strong partnership and cooperation between the customer involving project, maintenance and production people and the technology supplier, starting from the beginning of the project up to the test of the equipment, allows both AIC and Gerdau to find the most suitable solutions from the point of view of the quality, the technical details and the tailored safety procedures.

In the following image a safety local control station is shown: it is equipped with released safety keys, connected to the safety PLCs and it allows safe access conditions to the rolling mill area according to the status of the stands, motors and field devices.



The full customer satisfaction during the FAT (Factory Acceptance Test) of the panels is another significant step in the cooperation between AIC and Gerdau, one of the most important steel group in North and South America and one of the leading steel producer in the world.

AIC, your partner for tailored automation.

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