In BOF steel plants a short tap-to-tap time, consistent steel quality and high reliability are musts for complying with market requirements. To achieve this, a high level of automation is needed, but in traditional plants tapping is done manually. C-DRIVE provides a fully automatic tapping system for safe, reproducible, optimized tapping. C-DRIVE controls converter tilting, teeming ladle movement, and alloy chute position. After the blowing process the operator initializes the automatic tapping procedure. The converter tilts to a set tapping angle and the teeming ladle moves into the tapping position automatically. The lowering of the converter and moving of the teeming ladle are guided by self-learning software, which also monitors the condition of the lining of the converter and the tapping hole, taking into account - with each heat - the reduction due to wear of both of these parts, to guarantee the perfect tapping position. This means that an operator is no longer needed to manually check the tapping position.

**EQUIPMENT**

C-DRIVE is a software package that collects and evaluates the data received from Level 1 software, optimizing and automatically controlling the parameters for the converter tilting drive and teeming ladle car during the tapping process. Together with the automatic procedure for converter tilting and ladle car movement during tapping, the C-DRIVE is able to optimize all the parameters that affect the wear of the taphole and converter lining. With its “self-learning” function the software analyzes tapping duration, the success of the slag-retaining procedure, taphole wear, converter and ladle lining wear, and other data collected by Level 1. By analyzing these data the system manages, and if necessary modifies, the parameters of the tapping process in a continuous optimization process. C-DRIVE also can be combined with the C-HAWK system, the Danieli package for automatic slag detection and retention during tapping.

**PERFORMANCE ACHIEVEMENTS**

C-DRIVE has the following main technical features and advantages:

> Automatic and permanent calculation of converter tilting angle in order to achieve a smooth tapping procedure
> Optimal position and movement according to the actual evaluated figures of converter lining and tapping hole lining
> Calculation of optimal ladle car position based on the converter’s actual tilting angle
> Self-learning software for all steps
> Reproducible, standardized and safe tapping procedure by automatic and cyclic calculation of important tapping parameters
> Automatic positioning and control of ladle transfer car and alloy chute
> Increased operational safety owing to automatic control via main control room
> Smooth tapping procedure regardless of variations in other daily operations.