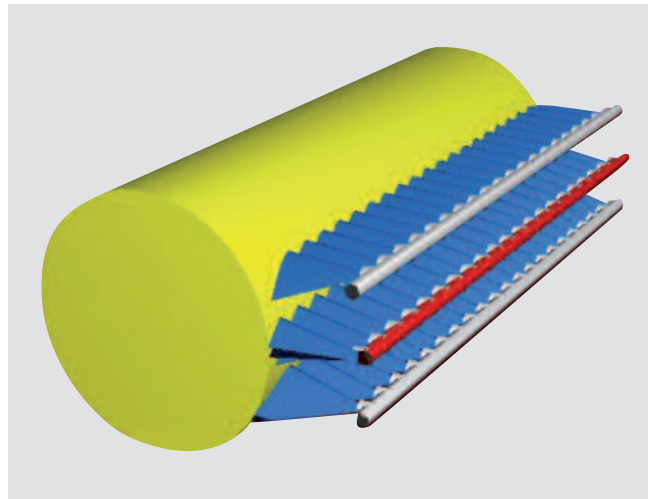


THERMAL ROLL COOLING STUDIES

Over the life span of a rolling mill the requirements in terms of product quality and the range of steel grades may change significantly. In particular the capability of the installed roll cooling systems needs to be investigated as one of the key technology area when it comes to process modifications aiming for a higher productivity.

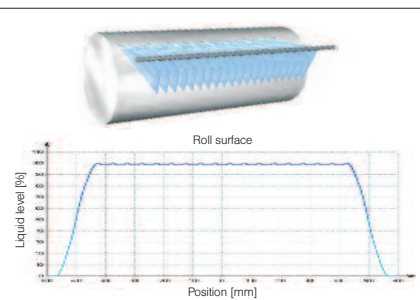
Having engineered and installed more than 350 selective cooling systems in steel, aluminium and non-ferrous rolling mills and having revamped a large number of conventional roll cooling systems in hot and cold rolling mills Lechler has the competence and experience to also help you to optimize your roll cooling system performance.



Roll cooling nozzle arrangement

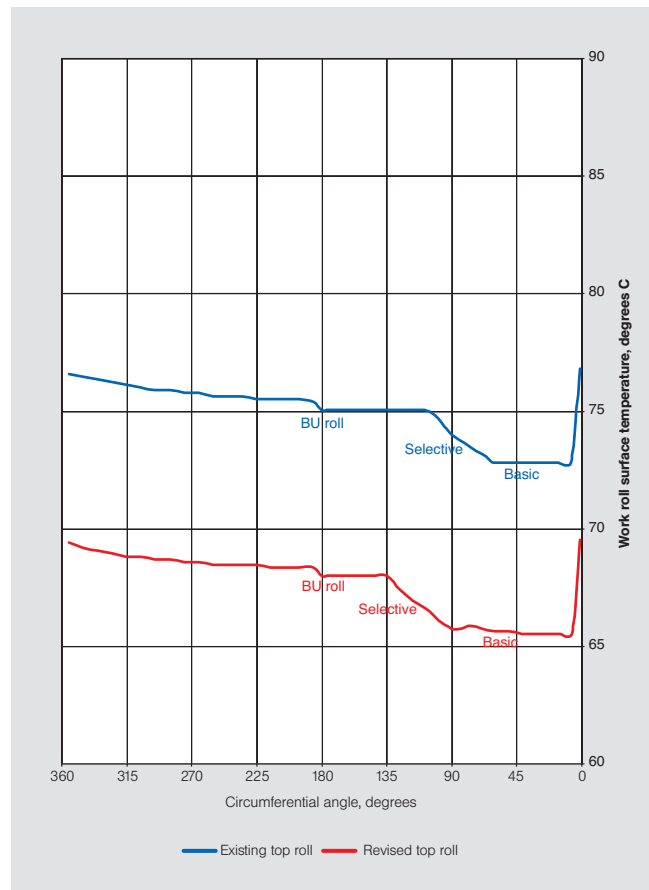
Thermal roll cooling studies help to:

- Improve product quality
- Increase mill speed and productivity
- Experience of 350 Roll cooling systems installed
- Optimized roll cooling headers and nozzles from one source



Optimum strip flatness thanks to simulation of the nozzle arrangement

Where the capability of Lechler was limited to the investigation of the coolant volume distribution characteristic Lechler can now also simulate the **thermal cooling effect** of the existing work roll sprays with a computer model.



Circumferential work roll temperature profile before (blue) and after (red) optimization

OPTIMIZE YOUR PROCESS

A roll cooling study is a systematic and structured approach and delivers a wide range of benefits by determining the improvements that can be obtained by an upgraded cooling system with improved operation and maintenance practices. The thoroughly documented final report, containing collected and analysed data and a proposal for future improvements through a system upgrade, forms a comprehensive and indispensable tool for decision making.

A study also identifies problems and causes which were previously not recognised. The time, efforts and cost of such work is insignificant in comparison with the potential benefits of a properly executed study which results in an optimised roll cooling system and the subsequent improvements in product quality, productivity and reduced operation costs.

Roll Cooling Study Phase 1

A typical roll cooling study would be carried out in two phases:

In Phase 1 a site visit could be the start during which data would be collected.

Benchmarking

Also included in Phase 1 would be the benchmarking of the cooling effect of the existing header and nozzle arrangement.

Based on the cooling effect and the heat input data the top and bottom work roll temperature can be calculated.

Spray cooling asymmetries and any other problematic areas would be highlighted in the final report of phase 1.

Speed and work roll diameter differences are being considered.

Roll Cooling Study Phase 2

There can be a number of reasons for conducting a study. The most common are:

- Identify strip shape defects and to eliminate them
- Extend work roll life time
- Increase rolling speed and productivity
- Improve maintenance friendliness and reduce costs
- Optimize coolant flow and hence save energy and coolant treatment costs
- Change of product formats and steel grades (product mix)

Objectives

In most cases it is a combination of all six reasons that determines the objectives for a revamp of the roll cooling system. It is important that these objectives are clearly defined so as to provide the study with a clear focus when preparing the final study report.

Based on the result of the benchmarking and the objectives the required cooling effect and the new heat input into the work rolls would be calculated. With these as an input a recommendation for an optimized nozzle and header arrangement would be worked out for every stand.

Mill Types

Roll cooling studies can be performed for the following flat rolling mills:

- Steel hot strip mills
- Tandem steel cold rolling mills
- Reversing steel cold rolling mills
- Steel plate rolling mills
- Every type of aluminum hot, cold and foil rolling mill
- Every type of NF-rolling mill (copper, brass etc.)

Lechler scope of supply

Phase 1 - Existing

- Performance of the entire site survey including the roll temperature measurements
- Presentation of the final report of Phase 1 (benchmarking)

Phase 2 - Optimization

- Calculation of the newly set cooling parameters which includes total coolant flow rates and pressures
- Complete basic and detailed engineering for new nozzle and header arrangement
- Manufacturing and supply of the new set of nozzles and accessories
- Fabrication and supply of the new set of roll cooling headers



Optimized spray header designed and fabricated by Lechler

Please contact Lechler for a first discussion regarding the optimization of your roll cooling system.

