

PIEPER

FROM ORE TO STEEL

SMART SOLUTIONS FOR THE STEEL INDUSTRY

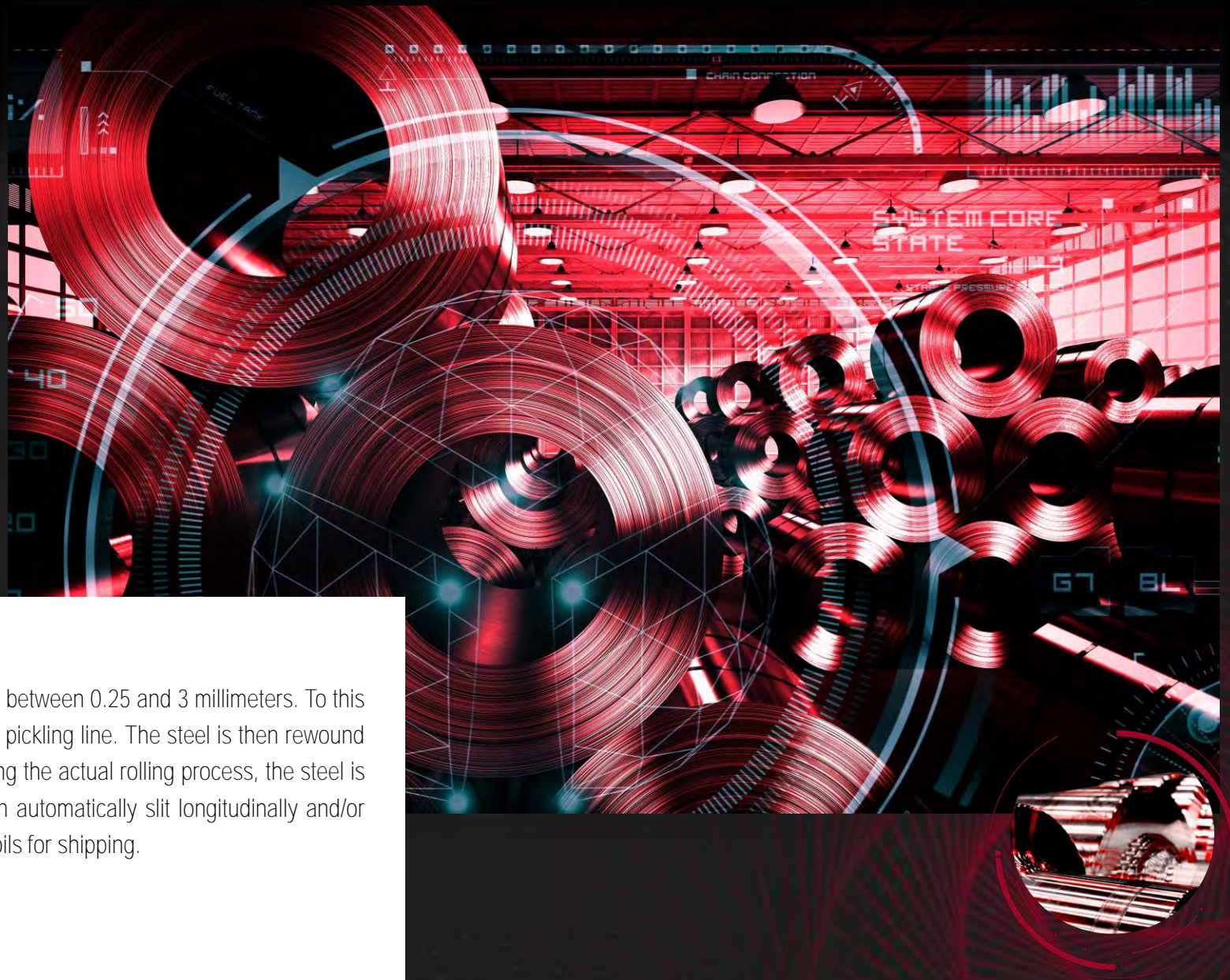
CONNECTED

THE COLD ROLLING MILL

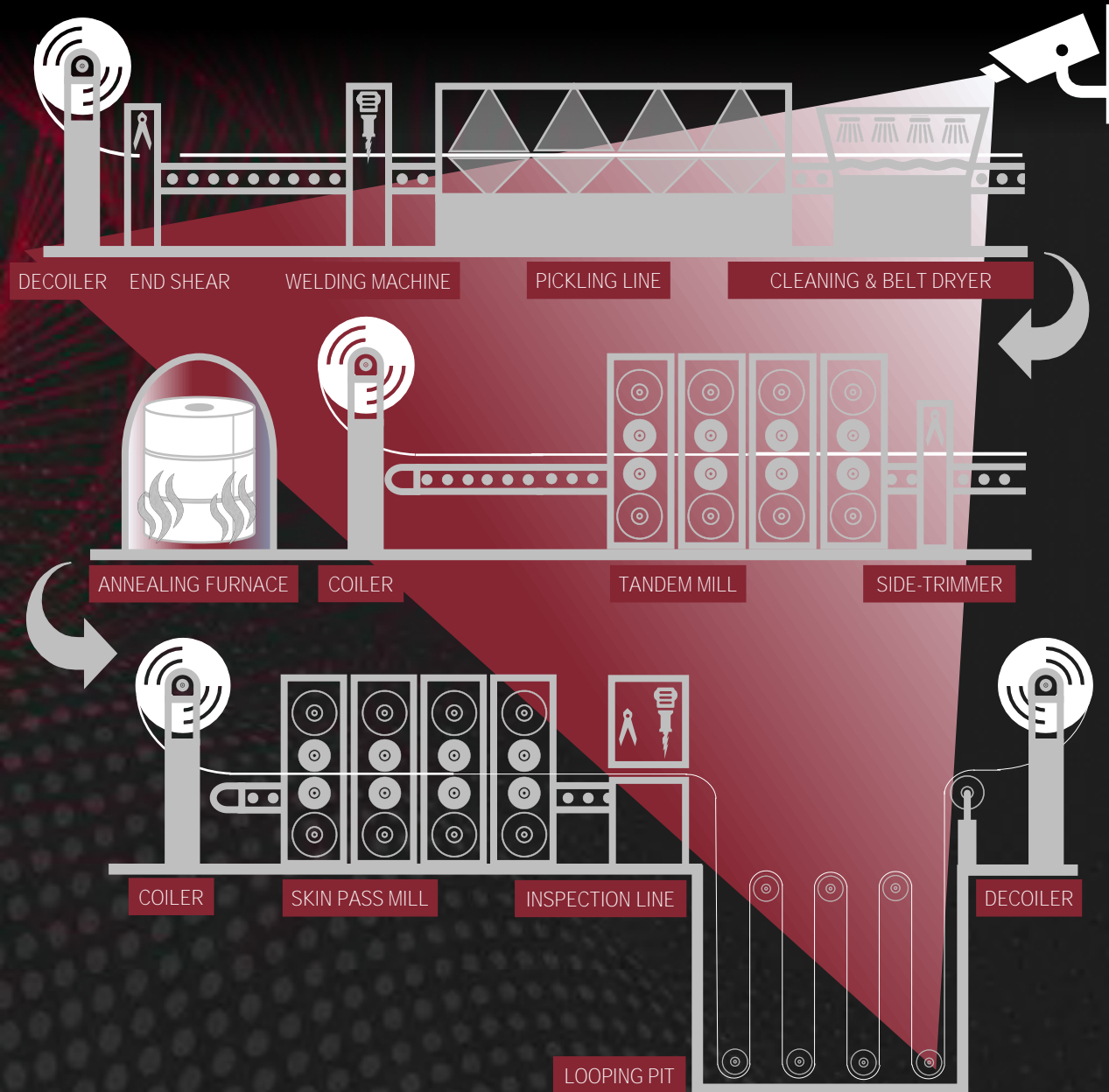
STEEL

THE COLD ROLLING MILL

In the cold rolling mill the steel strip is reduced to thicknesses between 0.25 and 3 millimeters. To this end, the strip is first freed from any scale still adhering in the pickling line. The steel is then rewound into coils and heated in the bell-type annealing furnace. During the actual rolling process, the steel is then given its final material properties. The cold strip is then automatically slit longitudinally and/or transversely in the slitting line before being rolled back into coils for shipping.



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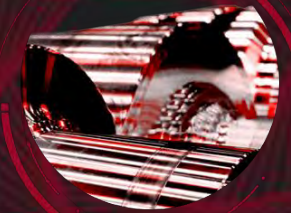


OVERVIEW CAMERAS

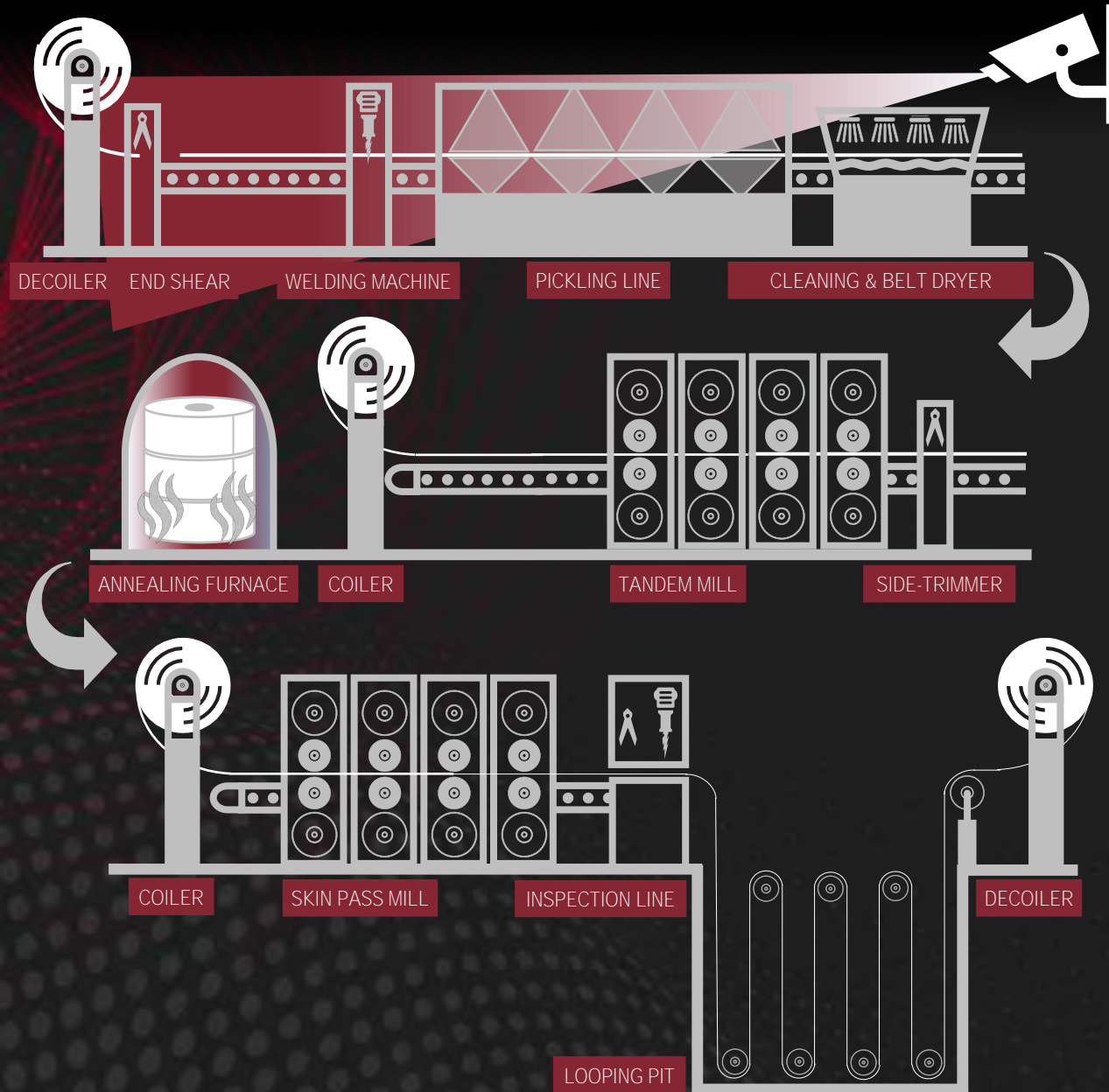
In **process monitoring**, which is geared towards detailed inspection and evaluation within a production chain, visual observation of the entire plant **shouldn't** be neglected. For this purpose, overview cameras are installed at strategic positions that they provide an **overall picture of the current production**. The images thus generated are transmitted live to the control center, so that any imminent malfunctions are detected at an early stage.

In addition to **avoiding cost-intensive production downtimes**, the **environment also benefits** here: a defective filter system can be detected more quickly, for example, as a change in the color of the exhaust gas often indicates a malfunction. The control center can thus take **immediate action and counteract dangers**.

At the same time, the use of surveillance cameras increases **work safety** for the specialist personnel directly working at the plants: The early detection of a malfunction, which the employee on site may not even be aware of, **reduces the risk of an accident to a minimum**.



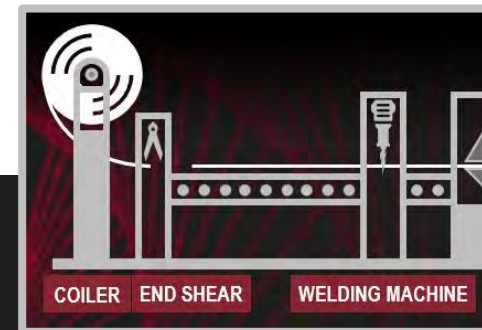
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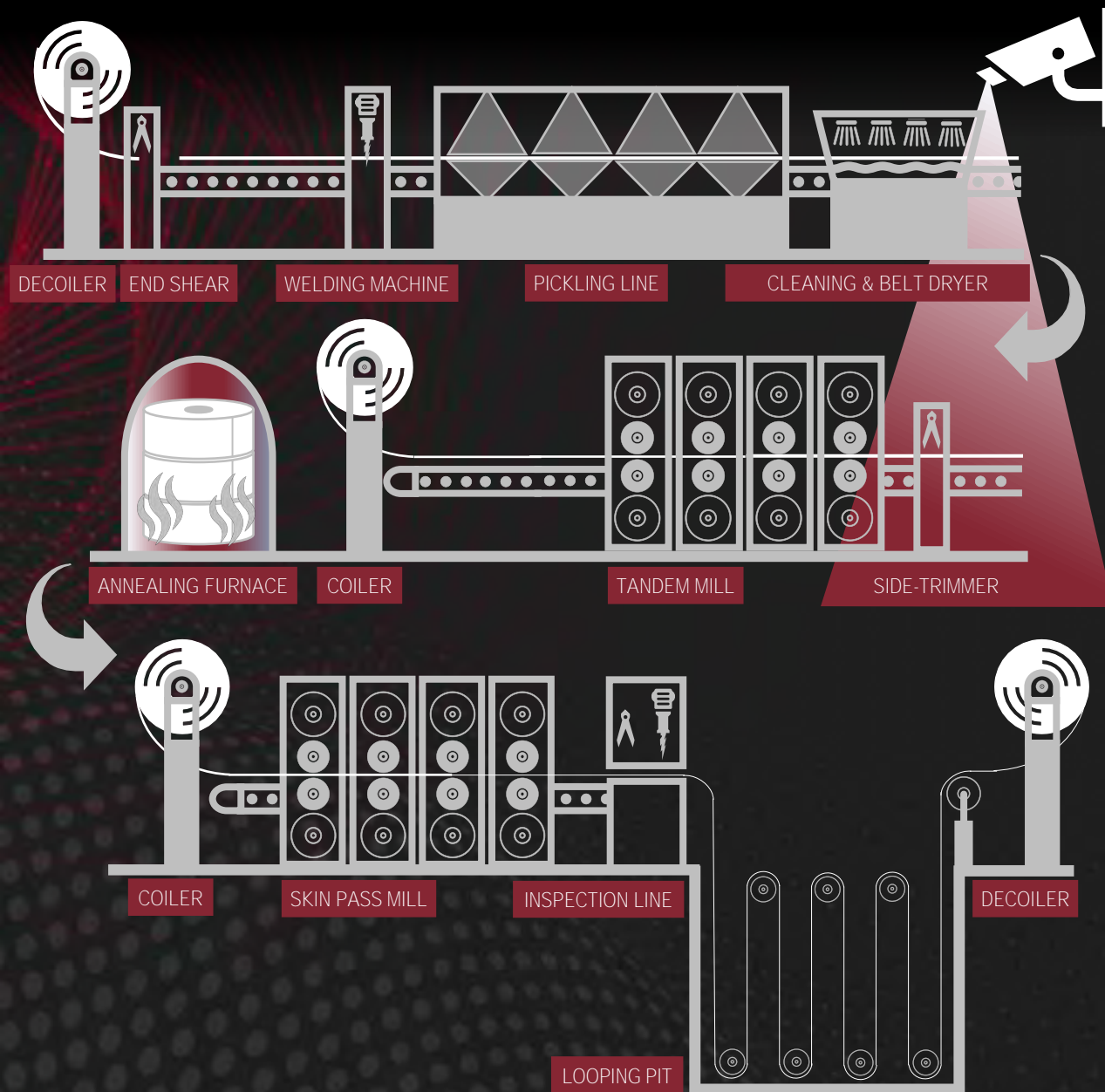
PRE-INSPECTION INLET AREA CONTINUOUS PICKLING LINE

In order to exclude possible material defects, a visual pre-control of the material is already carried out in the inlet area of the continuous pickling line when the coils are unwound. This important quality assurance process can be supported by visual cameras.

When uncoiling, the ends of each coil are first cut off with cropping shears in order to obtain uniform end edges. The product is then joined together in the **welding machine** to form an endless strip. The **faultless execution of the welding** is checked with the support of visual cameras.



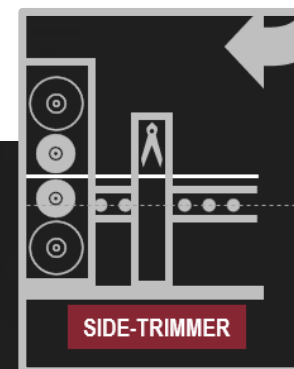
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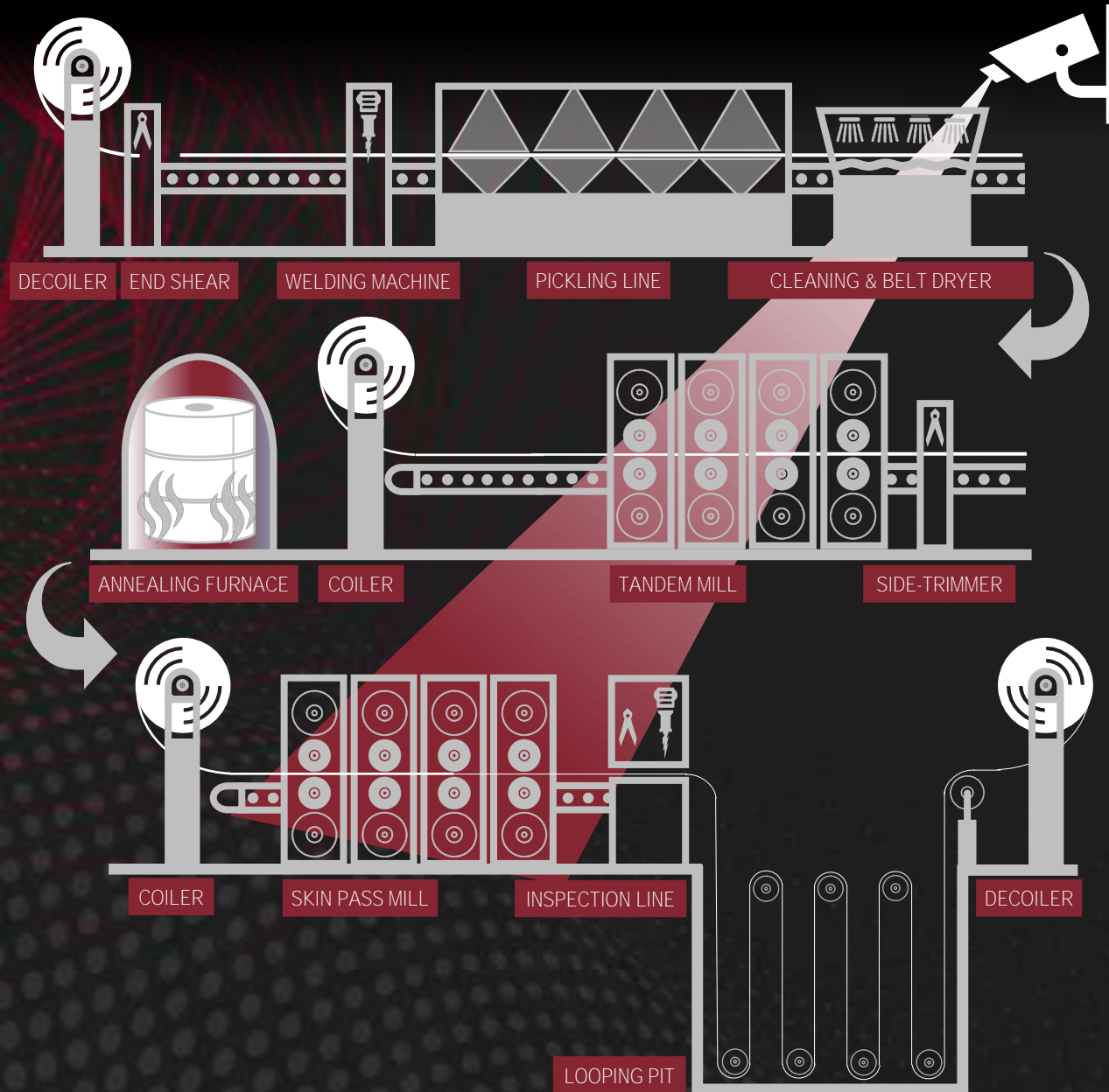
QUALITY ASSURANCE CONTINUOUS PICKLING

After removal of the oxide layer (scale), rinsing and drying of the strip, another **visual material testing** is carried out for **quality assurance**, which can be supported by **visual cameras**.

The **trimming cut**, which removes protruding edges of the strip before it enters the tandem mill, is also monitored with the aid of visual cameras. This **simplifies the manual correction of the strip run** for the operator before **it's** fed to the tandem mill, and thus to the first rolling process.



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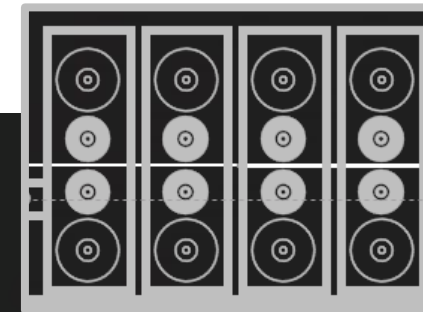


QUALITY ASSURANCE ROLLING MILLS

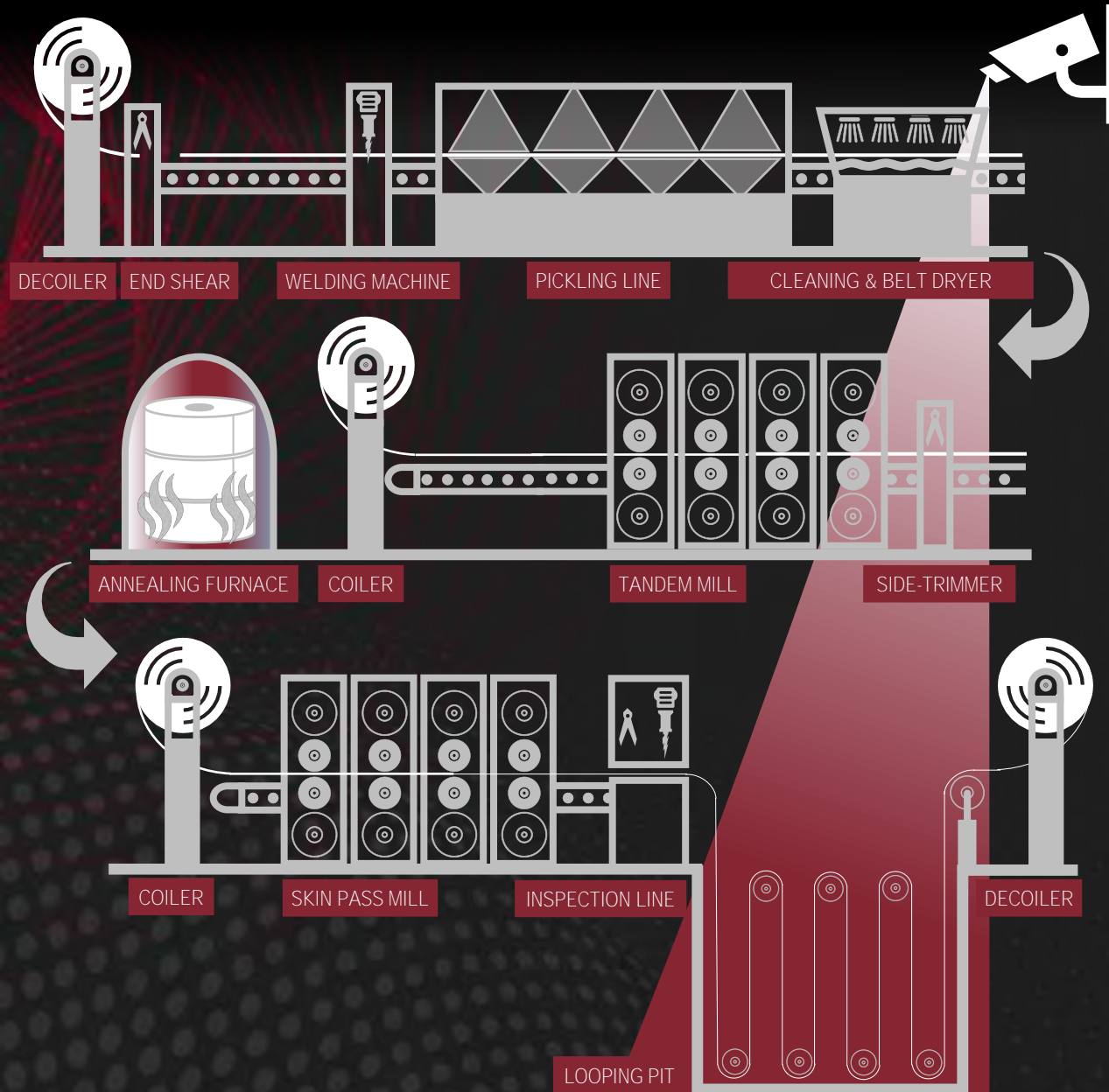
In both a **tandem mill** and a **skin pass mill**, the endless strip is guided through several rolls arranged in a row. In these processes the cold strip is given the required properties such as thickness or surface finish, with the mill trains being adjustable to customer requirements.

Since the rolls are generally exposed to **high levels of heat and vibration**, **there's** a certain **error potential** on rolls and/or the material. To ensure that this is noticed and remedied as quickly as possible, the rolling processes are monitored by **visual cameras**.

In addition to a visual inspection, the strip can also be monitored with special **line scan cameras** for **quality assurance** purposes. Although the installation is more cost-intensive, it can make sense if the material is subject to **high demands**, since those special-purpose cameras offer the advantage of detecting irregularities in the material at a very high strip running speed.



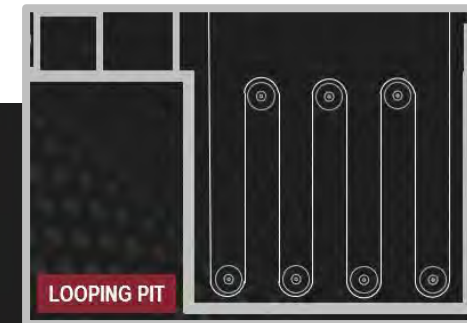
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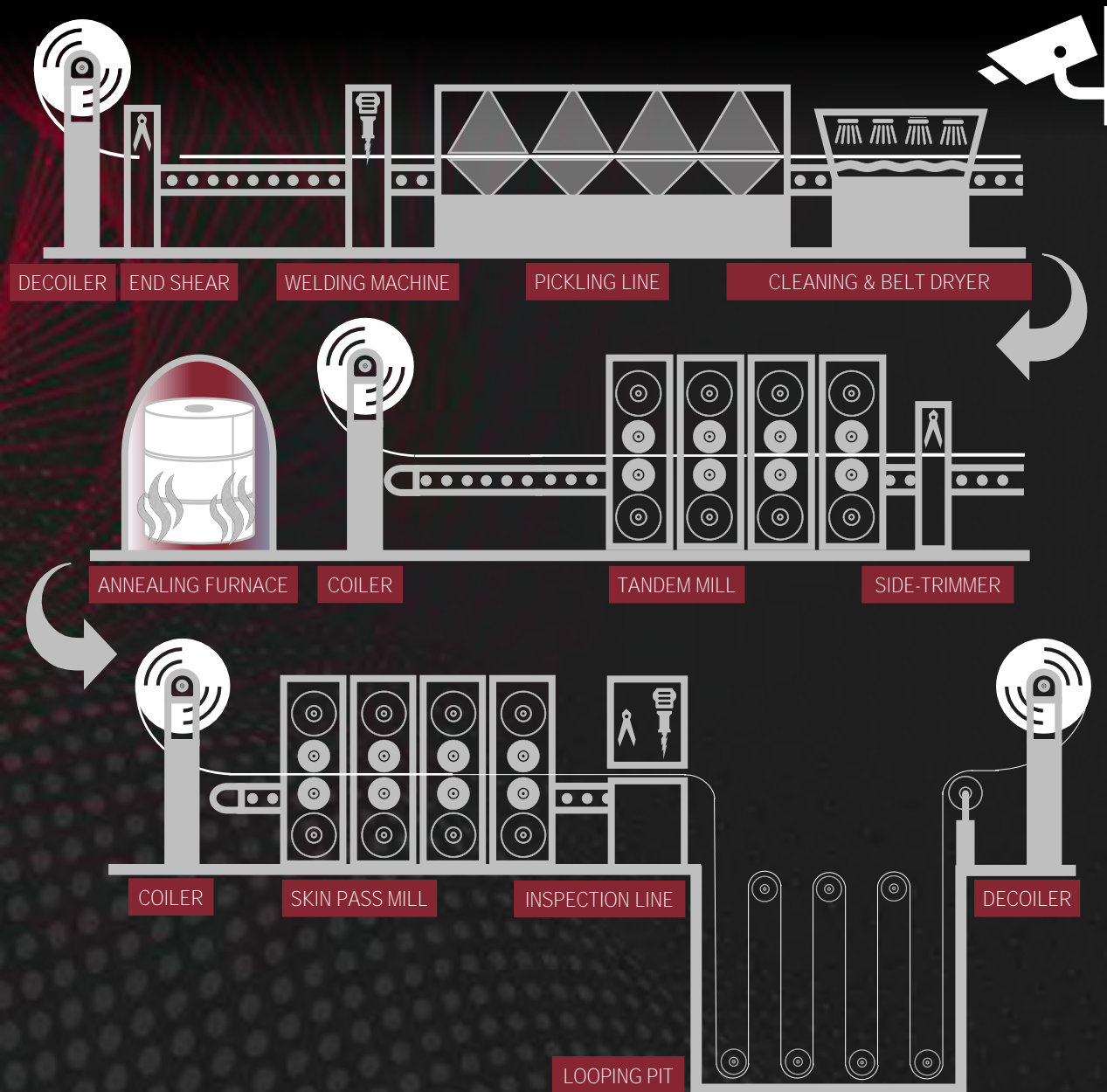
LOOPING PIT / STRIP ACCUMULATOR

Strip accumulators or looping pits are often used in cold rolling mills. Since the strip speed can be very high and the different strips are rewound into coils after splitting, such devices for length compensation are required to **avoid material jams**.

Visual **cameras** are used to check that the sheet metal, which is now very thin as a result of processing, **doesn't** tilt or break off, thus endangering the continuous production process.



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LOADING THE COILS

Visual cameras can be used to survey the finished coils. These give a general overview of the storage situation and are also used to monitor the correct loading for further transport.



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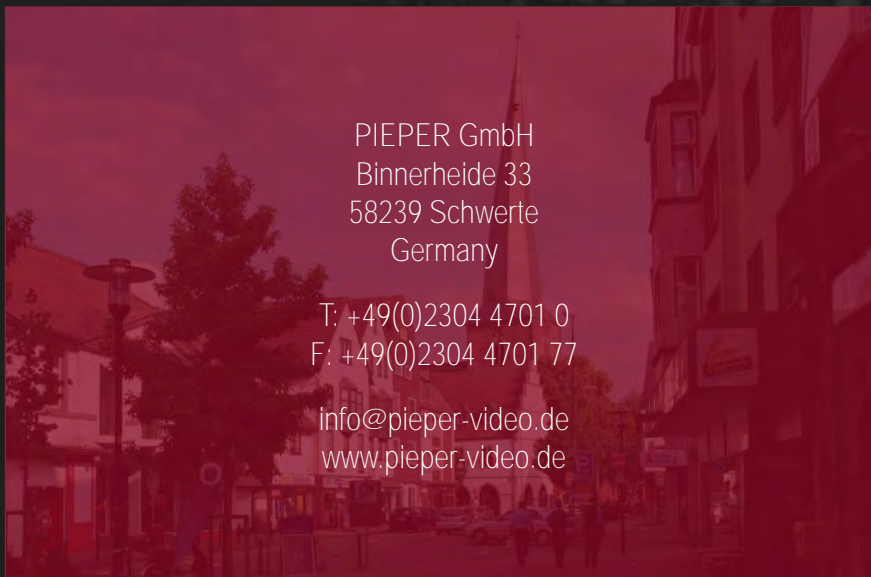
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