News Release
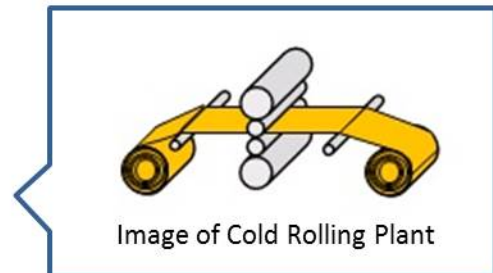
Hitachi Develops Real-Time Control Technology of Cold Rolling Plants for Steel Plants Using AI
Digitalizing the operational know-how of skilled workers
to contribute to improvements in operability and quality

Cold Rolling Plant

Image of Cold Rolling Plant

Tokyo, October 31, 2017 --- Hitachi, Ltd. (TSE:6501, Hitachi) announced today that it has developed the technology that uses AI[*1] to enable real-time control of the cold rolling plants[*2], which are used to produce steel products at steel plants. The technology has been uniquely developed using the Deep Learning[*3] method of AI. By learning very large numbers of accumulated steel product shape patterns and operation records, the machine can correct the shapes (waves on the steel product surfaces) through automatic control and improve the quality of the steel products. With the introduction of this technology, the know-how of skilled workers in cold rolling plant operations is digitalized and its control is automated, reducing the burden on operators and delivering high-quality and easy-to-machine steel products to end users.

In the past, when steel products were produced, some had a typical shape pattern with waves at the edges or in the center. To correct this, it was necessary to combine the machine's automatic shape recognition and pattern control with fine-tuning of the cold rolling plant by manual operations. However, because this method involved manual work, it caused the burden on the operators and the resulting various shapes depending on their skill levels. In addition, various shapes of steel products led to risks such as reduction in yield ratio, strip breakage of steel products, and damage to equipment.

In response to this situation, Hitachi has developed the cold rolling plant control technology using Deep Learning. This technology makes the deep learning network recognize the relationship between the manual operations of the cold rolling plant and the steel product shape records based on a huge volume of accumulated operation records and steel product shape patterns. It then automatically identifies the optimal control operation, and applies it to the control of the cold rolling plant in real time. By digitalizing the know-how on cold rolling plant operations possessed by skilled workers, the machine can learn controls that were previously executed manually, simplifying manual operations of the machine and reducing the burden on the operators. In addition, by learning the diverse relationships between steel product shape patterns and machine controls based on the vast store of accumulated data, the machine can automatically generate a new control method that has hitherto been inconceivable.

This technology utilizes not only the real-time control using AI but also Hitachi's control technologies and know-how. Specifically, it has a mechanism that feeds back the control results to improve the efficiency and accuracy of Deep Learning and that prevents abnormal output by Deep Learning based on know-how that has been accumulated over years in the control field. These can improve control performance while using this technology and prevent negative effects on the plants such as strip breakage of steel products or broken equipment caused by incorrect control.

In developing this technology, Hitachi confirmed its effectiveness in a demonstration experiment with this technology applied, which got underway at Beijing Shougang Co., Ltd., Qina'an Iron & Steel Co., Ltd. Hebei Steel Plant in August 2017. Hitachi will offer the products using this technology for steel plants from March 2018. Hitachi will focus on productization of control systems using this technology and expand the business to steel plants and other industries as a solution core of the IoT platform Lumada.
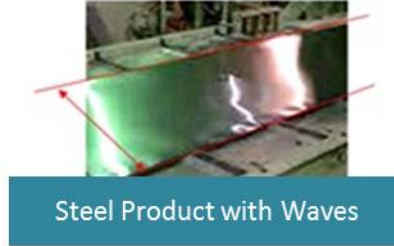
*1 AI: Artificial Intelligence
*2 A cold rolling plant is equipment that presses and rolls out coil-shaped (rolled) steel products at ordinary temperatures
*3 Deep Learning: A machine learning method using a neural network, which employs the same mechanism as that of nerve cells in the brain

Successfully Rolled Steel Product (Left) and Steel Product with Waves (Right)

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges. The company's consolidated revenues for fiscal 2016 (ended March 31, 2017) totaled 9,162.2 billion yen ($81.8 billion). The Hitachi Group is a global leader in the Social Innovation Business, and it has approximately 304,000 employees worldwide. Through collaborative creation, Hitachi is providing solutions to customers in a broad range of sectors, including Power / Energy, Industry / Distribution / Water, Urban Development, and Finance / Government & Public / Healthcare. For more information on Hitachi, please visit the company's website at http://www.hitachi.com.

#