Every operation of a crane with a rope-suspended load provokes swaying movements of the load. Therefore, the crane operator must continuously take corrective actions in response to this sway movement. Skilled crane operators take countermeasures to prevent sway. However, if crane drivers are distracted or the driver is lacking experience, simple moves may result in a big loss of time and a risk of collisions.

Any motion of a crane where cables or ropes are involved causes the load to sway and can therefore be a source of danger to man and material. This sway also means that transport operations take longer.

One method of making the process more efficient is the reduction of ‘sway’ – the pendulum motion induced by moving a load from one position to another, while it is suspended by cables from the loading crane. Before a load can be placed on the ship or pier, the crane operator must reduce the sway to a few millimeters. In an unassisted, manual operation, this process can occupy more than 30% of the average move time. To increase productivity, the Sway control system offers the opportunity to minimize the crane handling time, simplify the complex operation tasks, assist crane drivers, keep the throughput constant and avoid physical damage to the crane and crane driver.

Advanced crane features like sway control, trim, list & skew control, vehicle positioning, position control, profile scanning, collision prevention are integrated into SIMOCRANE Advanced Technology modules. The SIMOCRANE Sway control feature offers a powerful sway control system with neutralization of sway and automatic positioning. This system provides a higher degree of safety for personnel, the goods being transported and system elements. The automatic sway control relieves the crane operator and at the same time the load can be moved quickly and more precisely positioned.

With the automatic sway control the load is moved smoothly and in such a way that the load avoids the restricted areas fully automatically with maximal crane dynamics and high accuracy from the start position to the target location.
Application area

The sway control system supplements new crane controls; however it can be retrofitted to existing crane controls. SIMOCRANE Sway Control can also be installed in cranes which use drive technology or from another company. Prerequisites for using SIMOCRANE Sway Control are a crane control system as well as drives that can be continuously controlled. In some instances, position sensors are required. Sensors for luffing gear and hoisting gear must be available. For all other crane types, sensors are required for the hoisting gear – and for automatic positioning, sensors for the axes that have to be positioned.

SIMOCRANE Sway Control is suitable for the following crane types:
- Gantry cranes (OHBCs)
- Rubber Tired Gantry Cranes (RTGs)
- Rail Mounted Gantry Cranes (RMGs)
- Container cranes (STS)
- Grab ship unloader (GSU)

Siemens’ extensive experience in cranes has led to an integrated and ergonomic sway control system. The systems corrections are smooth and optimized like a highly skilled crane driver would perform them. The result is an unmatched “natural feel” which if highly appreciated by crane drivers.

Function

The sway control system is based on calculations of a mathematical oscillation model. The parameters hoisting height, swing angle and Skew angle are determined with camera by means of optical measurement. The camera, fitted to the trolley, continuously measures the load movements and calculates the speeds while the crane is travelling which incidentally neutralizes the sway. Different control algorithms enable to adapt the behaviour to specific requirements like high handling speeds or thorough crane operation. High efficiency algorithms ensure high operational reliability even in poor sight conditions.

The sway control of the load is performed by specifically inducement for each axis individually to the target position. After start, this position is automatically approached under sway control so that the load move sway controlled with the maximum speed to the target position, like at grab ship unloaders.

Contact us at cranes.i@siemens.com to receive further information how you can boost your productivity at highest safety standards.