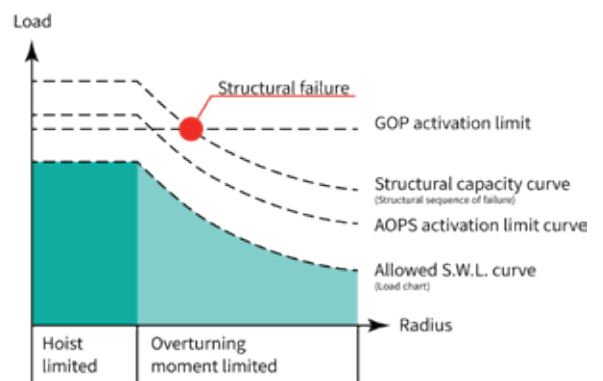


Automatic Overload Protection System for Offshore Cranes



What is AOPS?

The Automatic Overload Protection System (AOPS) is an active safety system which automatically engages when a set of conditions are fulfilled and a preset activation limit is exceeded simultaneously. The conditions often include the position of the boom tip, the hook, reeving configuration, the actual load in the hook, and the load on the luffing system. Furthermore, it is a safety system which is fully integrated into the crane control system, and designed specifically to the crane's structural capacity to protect the area on and around the crane from falling parts. The activation limit of the AOPS is well above the allowed lifting capacity, as well as, safely below the structural capacity of the crane. When activated, hold-back force is at least equal to the allowed safe working load (SWL), meaning low enough to ensure integrity of all structural components and yet high enough to prevent an inadvertent load release at any and all operating radii.



Automatic Overload Protection Systems (AOPS) for Offshore Cranes

Why AOPS?

AOPS is the only safety system for offshore cranes that will fully protect personnel and assets from the danger of falling objects due to a critical overload situation. There have been discussions throughout the offshore oil and gas industry as to whether cranes should rely on AOPS or structural sequence of failure as the ultimate barrier against pulling a crane off its foundation. This should not be an "either or" discussion. Most offshore cranes designed with AOPS also incorporate the structural sequence of failure data as a standard complement to the crane package. All offshore cranes designed according to EN-standards have had AOPS incorporated in their design for many years, so this is nothing new to the global offshore crane market. Also, an increasing number of owners voluntarily install AOPS on their cranes to achieve the best available safety level for their crew and assets.

In the case of a serious overload situation, the subsequent downtime to return the crane to full operational condition will be substantially less on a crane equipped with AOPS than on a crane relying solely on structural sequence of failure for overload protection. The extent of repair on a crane equipped with AOPS would be limited to inspections and potentially replacement of nonstructural components; whereas a crane without AOPS would require major structural repairs. AOPS and structural sequence failure go hand in hand and should be viewed as such to achieve the greatest degree of protection from a crane separating from its pedestal (or kingpost).

Misunderstandings about AOPS

It's possible to boom out with a load to activate the AOPS:

This is wrong: the control system will not allow the boom to be lowered into an overturning moment outside what is safe and allowed on the SWL curve.

AOPS is an automatically activated Gross Overload Protection System (GOPS):

This is wrong: a GOPS has traditionally only been a hydraulic safety system protecting the hoisting system. The function has normally been similar to a safety release valve. A GOPS will not prevent significant damage to the crane if the reeving and operational radius place the crane in an operating configuration where the moment is the limiting part of the load curve (higher radii, see figure above). An AOPS activation limit will precisely follow the load curve with a hold-back force at a sufficient level.

AOPS is and automatic activated Manual Overload Protection System (MOPS) or Emergency Load Release:

This is wrong: the hold-back force in the hoisting system when the AOPS is activated is sufficient to suspend a load at least equal to the allowed rated load for the given configuration and radius. MOPS would only be able to suspend a load equal to or less than 10-20% of SWL while Emergency Load Release would release the hoist brakes and allow the load to drop, in most cases without any hold-back force at all.

Activation of AOPS can lead to dropping of the load while the load is over the host structure:

This is wrong: for additional safety, the AOPS can only be activated when the boom tip is outside the platform boundaries and when the hook is at a level below the cellar deck. In the unlikely event the AOPS is activated with a load over the installation, the hold back force in the hoisting system will always prevent the load from dropping.

AOPS vs. Structural Sequence of Failure:

There is no such thing as AOPS vs. Structural Sequence of Failure. Sequence of failure cannot replace the function or level of safety provided by AOPS. This could only be true if the purpose of the AOPS was to protect the crane operator only, which it's not. AOPS is as much a part of the overloading protection of the crane as structural sequence of failure. With an automatic overload protection system installed on a crane, the sequence of failure is a secondary barrier which hopefully will never be required. Relying on Structural Sequence of Failure for the crane's primary overload protection means catastrophic failure of structural components will occur, increasing the risk of injury to personnel working on and around the lifting and handling environment.

The AOPS is designed to protect the crane and not personnel:

This is wrong: the AOPS prevents failed parts from falling down and causing injury to personnel as well as assets. While failure of motors, gearboxes, etc. is allowed and repair of parts is likely after a significant AOPS activation, debris from damaged components will not separate from the crane; so they pose no danger to personnel or assets.

AOPS is only available on EN cranes:

This is wrong: API Specification 2C is a minimum requirement specification. AOPS can be supplied on API monogrammed cranes from companies offering AOPS without affecting API certification.

AOPS is analogous to a trivial safety system:

This is wrong: AOPS is an active barrier that prevents the dangerous situations for which it is designed from escalating into even more dangerous and potentially fatal events. It can be compared to the airbag of a car; if an accident occurs, the airbag will deploy and reduce impact on the humans inside the car. Today, no one orders a car without air bags.

