

# Overhead Crane Machine Safety

## Technical Features Overview

### CRANEVISION™ – SNAG DETECTION

**Description:** Detect snag condition – issue stop command to the motors.

**Safety Focus:** Feature can prevent adverse load motion under some (not all) snagging conditions.

### CRANEVISION™ – SIDELOAD DETECTION

**Description:** Detect side load condition – prevent hoisting when side loaded.

**Safety Focus:** Prevent the crane from hoisting if the load is not centered under the hook. This will prevent the load from shifting/swinging when it is picked up off the ground.

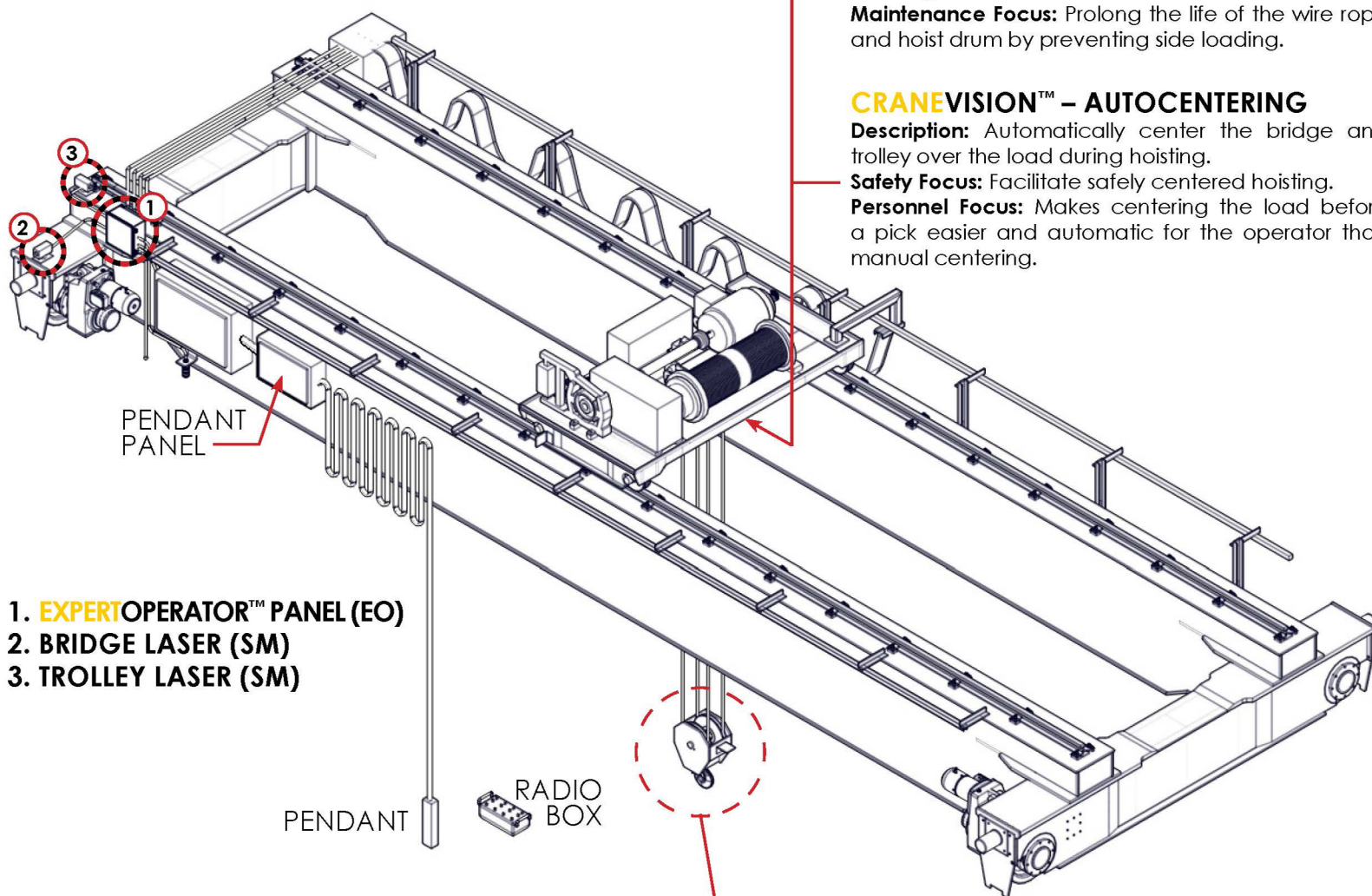
**Maintenance Focus:** Prolong the life of the wire rope and hoist drum by preventing side loading.

### CRANEVISION™ – AUTOCENTERING

**Description:** Automatically center the bridge and trolley over the load during hoisting.

**Safety Focus:** Facilitate safely centered hoisting.

**Personnel Focus:** Makes centering the load before a pick easier and automatic for the operator than manual centering.



PENDANT  
PANEL

PENDANT

RADIO  
BOX

1. **EXPERT OPERATOR™** PANEL (EO)
2. **BRIDGE LASER (SM)**
3. **TROLLEY LASER (SM)**

### SAFEMOVE™

**Description:** Programmed zones that the crane cannot enter (e.g. machine equipment, operator platforms)

**Safety Focus:** Prevent collisions between the crane /load and surrounding infrastructure.

**Maintenance Focus:** Reduce maintenance on items /infrastructure that is frequently damaged by collisions.

### EXPERT OPERATOR™

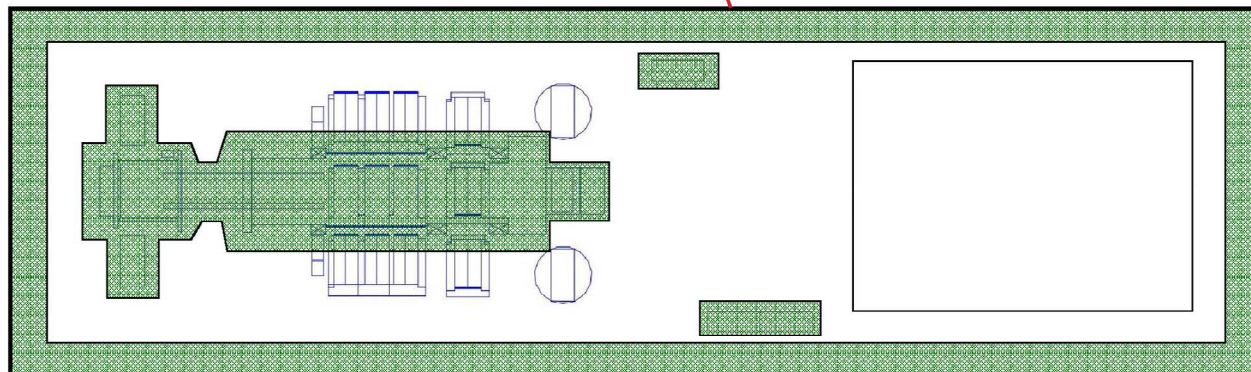
**Description:** Software modifies operator commands to be safer.

**Safety Focus:** Reduce load swing by 85 – 95%.

**Maintenance Focus:** Prolong the life of motors/drives because crane moves more smoothly & efficiently.

**Personnel Focus:** Crane easier to operate. Novice operators can perform as well as experienced operators

**Efficiency Focus:** Positioning efficiency can increase by 10 – 40%.





# Features at a Glance

## Feature Overview & Description



### EXPERT OPERATOR™ anti-sway technology

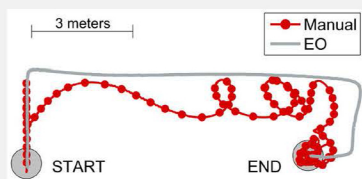
**PRODUCTIVITY.** Hundreds of operator studies demonstrate that cycle time improves by 10 – 40%.

**SWAY SUPPRESSION.** Load swing reduced by 85 – 95% over entire hoist range, even with complicated rigging.

**SENSORLESS.** Does not require encoders, zone sensors, or other length measurement.

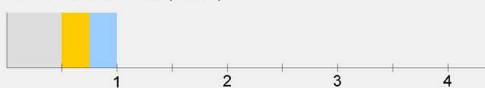
**PERSONNEL.** Novice operators perform as well as experienced counter parts.

**HOW IT WORKS.** EO is a hardware module that intercepts pendent commands – converts them into expert commands – and then issues the modified commands to crane.



DRIVE COMPATIBILITY	BRIDGE	TROLLEY	HOIST
VARIABLE FREQUENCY	●	●	●
CONTACTOR	○	○	●

#### INTEGRATION TIME (DAYS)



### SAFEMOVE™ collision prevention technology

**SAFETY.** Safety boundaries can enclose equipment, products, end-stops, and personnel to prevent the crane and payload from collisions.

**PROTECTION AT PAYLOAD.** SM can be used with EO. This prevents both the crane *structure* and the crane *hook* from penetrating into a protected region.

**SMOOTH & PRECISE.** SM does not abruptly stop crane motion when a safety boundary is crossed. Instead, the control smoothly slows and then stops the crane at the protected region.

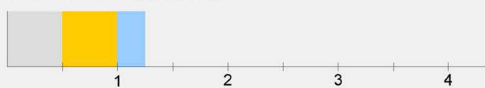
**HOW IT WORKS.** No-fly zones protect multiple regions throughout the workspace. Zones are configured using a graphical industrial tablet PC. Zones can be disabled at any-time to permit maintenance access into the zones. Laser positioning sensors are added to the crane to obtain crane position.



DRIVE COMPATIBILITY	BRIDGE	TROLLEY	HOIST
VARIABLE FREQUENCY	●	●	●
CONTACTOR	●*	●*	●

\* Smooth stopping not possible.

#### INTEGRATION TIME (DAYS)



### CRANEVISION™ vision-based crane safety

**SIDE LOAD DETECTION.** If an operator is side-loading the crane, then CV prevents hoisting until the load is centered.

**AUTOMATIC LOAD CENTERING.** If an operator is side-loading the crane, CV automatically adjust the bridge and trolley position so that the load is safely and quickly centered.

**SNAG DETECTION.** CV can detect when the bottom block has been snagged during traverse motion. When a snag is detected, the CV system issues a stop command to the crane to prevent additional unsafe commands.

**HOW IT WORKS.** A machine vision system monitors the bottom block for unsafe conditions. The vision system is mounted on the trolley and oriented downward. In this configuration, the hook is always visible to the camera.

The camera tracks a fiducial pattern mounted on the hook. An image is captured & analyzed every 20 ms.

DRIVE COMPATIBILITY	BRIDGE	TROLLEY	HOIST
VARIABLE FREQUENCY	●	●	●
CONTACTOR	●*	●*	●

\* Snag detection & Side-load detection.

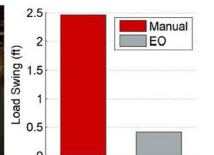
#### INTEGRATION TIME (DAYS)



**EXPERT OPERATOR™ (EO)**  
**SAFEMOVE™ (SM)**  
**AUTOMOVE™ (AM)**  
**CRANEVISION™ (CV)**

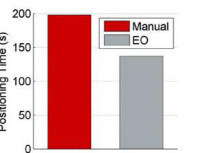
# Load Swing & Productivity Reports

## Typical Load Swing Reduction & Positioning Efficiency Data



Industry: Primary Metals  
Capacity: 25-Ton  
Use: Material Handling

Load Swing (Manual): 2.46 ft.  
Load Swing (EO): 0.42 ft.  
% Reduction: 83.0%



Industry: Heavy Equipment  
Capacity: 60-Ton  
Use: Production

Positioning Time (Manual): 198 s.  
Positioning Time (EO): 137 s.  
% Reduction: 31%

Operator	Experience	Operator Comments	Trial	EO™ Enabled	Collisions or Near Misses	Move Time (mm:ss)	Pendent Button Press/Release Count						
							Up	Down	East	West	North	South	Total
A	Moderate	"It's great, made it a lot easier."	1	No	4	07:11	3	4	30	46	47	21	151
			2	No	9	05:21	1	1	32	39	48	12	133
			3	Yes	0	06:30	2	2	4	4	21	3	36
B	Novice	"It was easier to anticipate stopping."	1	No	12	05:50	2	3	24	24	50	36	139
			2	Yes	0	04:36	1	1	3	5	9	6	25
C	Expert	"Incredible, quickly builds confidence."	1	No	7	06:59	1	2	8	16	19	11	57
			2	Yes	0	03:31	2	2	5	3	6	3	21
D	Novice	"It felt much safer."	1	No	14	07:37	1	1	27	33	24	28	114
			2	Yes	2	04:28	1	1	10	5	13	13	43
E	Moderate	"The stopping distance remains, just limited swing when reached. Less stress to constantly monitor the load."	1	No	0	05:45	1	1	9	27	31	22	91
			2	Yes	0	04:25	1	1	2	8	15	10	37
			3	No	0	03:21	1	1	7	12	20	18	59
			4	Yes	0	03:15	1	2	4	12	8	10	37