Designed to

MACGREGOR

PERFORM WITH THE SEA

ACV-1 “Hippo”

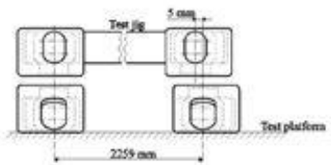
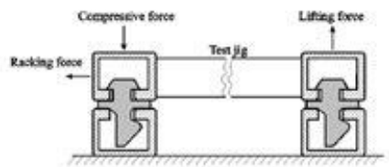
Fully Automatic Twistlock

Validation tests

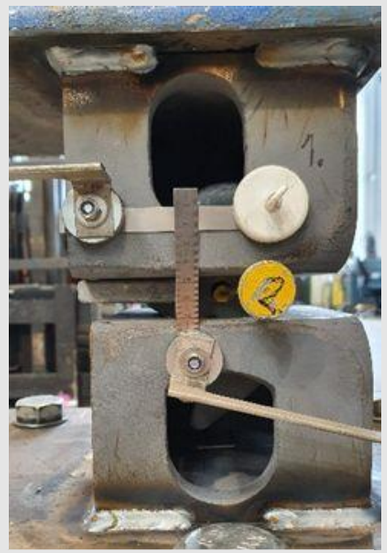
MACGREGOR

DNV operational testing of fully automatic locks

Fully automatic twistlocks are to be tested according to below shown test in order to be approved by DNV. In addition to this test the lifting force was also tested up to 500kN in order to determine ACV-1's resistance against slip-out. Testing was done in 3rd party laboratory at Drehtainer GmbH, near Hamburg Germany.

Type	*Test arrangement and loading scenario*	*Test load [kN]*	
Fully automatic locks	Test setup: The distance between center lines of the corner casting apertures on the test jig shall 5 mm less than distance between center lines of the corner casting apertures on the test platform.  Loading scenario: First, the test jig shall be shifted in the direction of racking force as far as possible within the clearance of the locks. Subsequently, test forces shall be applied in the following sequence: a) compressive force b) racking force c) lifting force 	Compressive force	350
		Racking force	150
		Lifting force	275

Test jig at Drehtainer



Vertical clearance less than 12mm at SWL lifting force of 250kN

No slip-out with 500kN of lifting force. Compression 350kN, racking force 150kN

MACGREGOR

Standard strength testing

In addition to operational testing ACV-1 was tested also for Break Loads (BL) same way as any other lashing product. The min. BL's for ACV-1 are:

- min. tension BL: 500kN
- min. shear BL: 420kN
- min. compression BL: 2000kN

Break Load means the force that lock has to endure without breaking. The product can endure even higher forces. ACV-1 has endured tension load of 625kN without breaking and could go even higher. 625kN is the maximum tension force of the test bench.

ACV-1 in tension test jig

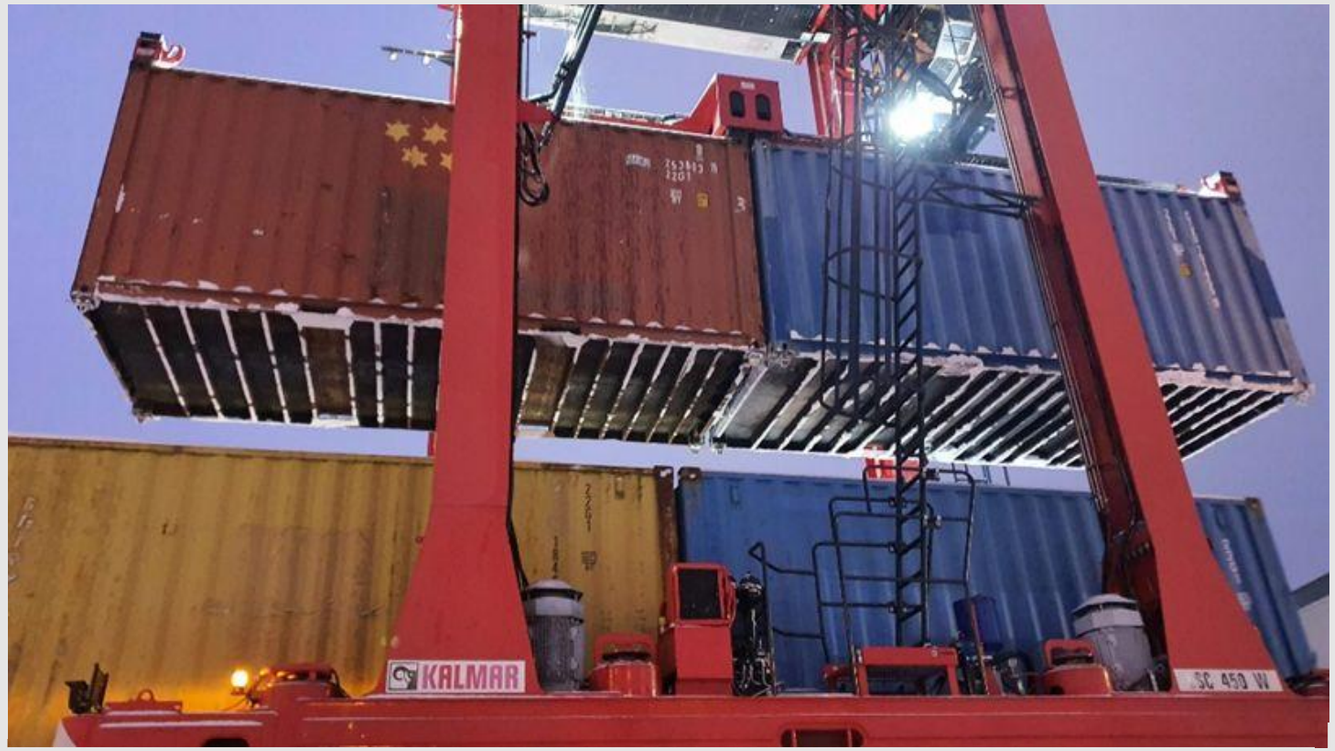
ACV-1's tested to tension of 625kN

MACGREGOR

Port operation tests of ACV-1

In addition to strength testing also the port operation of ACV-1 has been tested thoroughly. These tests determine how well ACV-1 is performing in loading & discharging of containers and other situations faced in ports. On this and following page you'll see photos of some of tests done.

Operation in arctic environment = OK



Horizontal tandem lifting of 20ft containers = OK

Loading and discharging with 4 degrees of list = OK

MACGREGOR

Port operation tests of ACV-1

Coning & de-coning in to containers of various conditions, from new ones to old & worn = OK

MACGREGOR

Port operation tests of ACV-1

Loading of containers with ACV-1 onboard MV Greta

MACGREGOR

Fatigue tests of ACV-1

The handle wire ACV-1 has been tested with 25 000 pulls before it broke. If we consider that handle is pulled two times per week this means that handle will endure 240 years.

ACV-1 in wire handle pulling test

MACGREGOR


DESIGNED TO PERFORM
WITH THE SEA
MACGREGOR