ARCTIC PASSION, Helsinki 15.04.2018

Ilkka Rantanen

Starkice is specialized in Arctic de-icing systems for vessels, platforms and terminals. Our innovative system and turnkey solutions include full life cycle support, from the designing to the installation and maintenance. Starkice is a joint-venture of the companies who are leading experts of their own specialized areas and have altogether over 150 years of operational experience with clients who operate daily in cold climate environments.

Our mission is to provide

THE SAFEST AND MOST ENERGY EFFICIENT DE-ICING SYSTEMS IN THE WORLD

100+ designed ice operating vessels or platforms

90 milj. meters of delivered cables and elements

+5000 sensors in operation world wide

20 milj. hours of ice detecting sensor operating time

150 years of operational experience

STARKICE

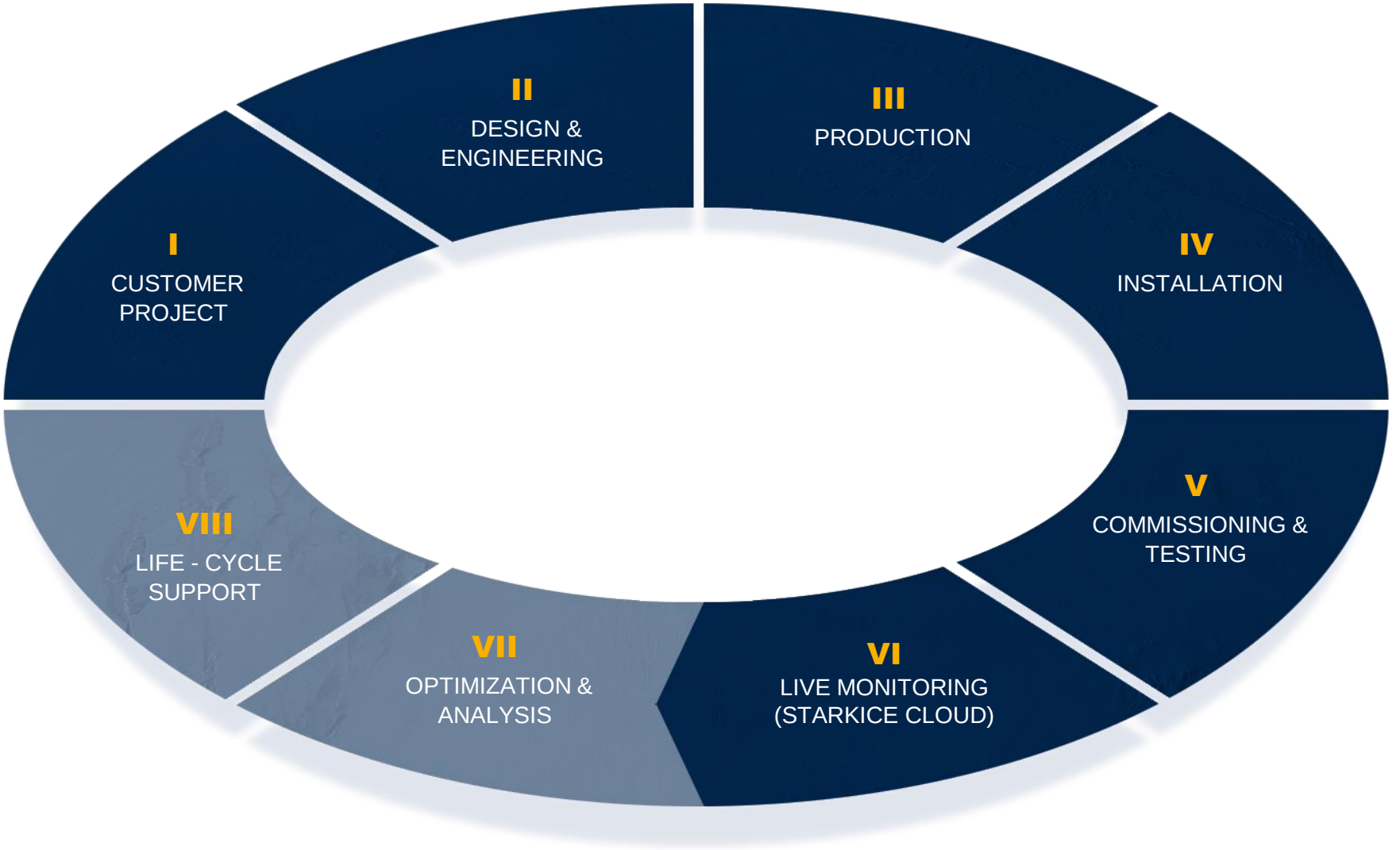
ENERGY EFFICIENCY DE-ICING SYSTEM

COST SAVINGS, EFFICIENCY AND SAFETY

ICE CLOUD SYSTEM

COMPANY • SYSTEM • PRODUCTS

OUR PROCESS

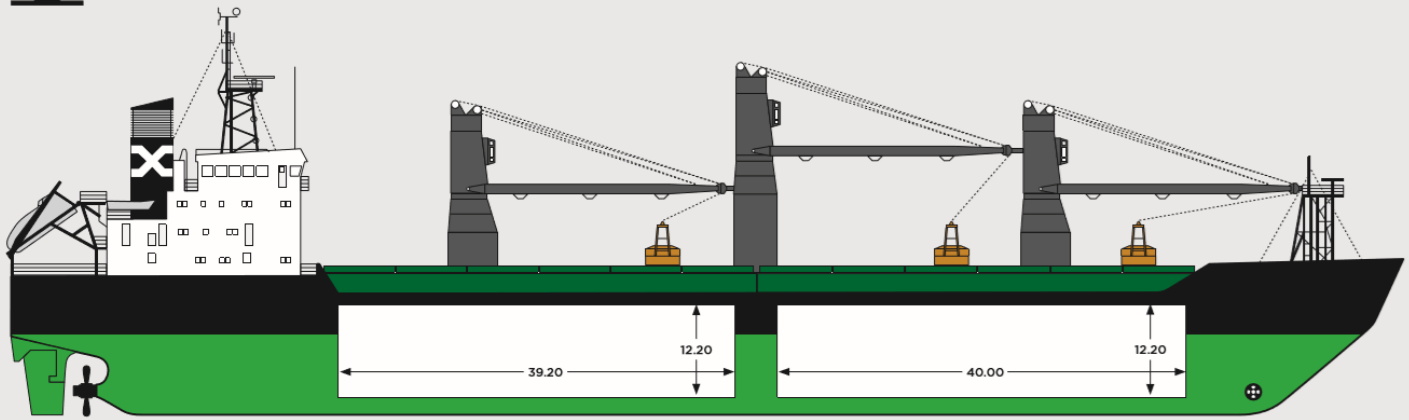

I
CUSTOMER PROJECT
II
DESIGN & ENGINEERING
III
PRODUCTION
IV
INSTALLATION
V
COMMISSIONING & TESTING
VI
LIVE MONITORING (STARKICE CLOUD)
VII
OPTIMIZATION & ANALYSIS
VIII
LIFE - CYCLE SUPPORT

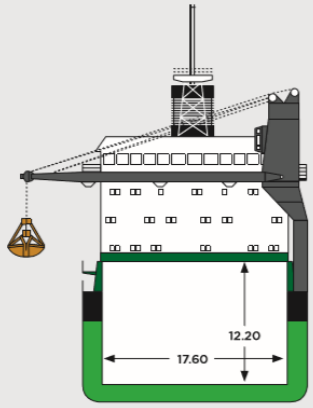
STARKICE

FIELD RESEACH 2016-2018 + FINDINGS

Vessel Data: MS Pasila

ESL Shipping





PASILA & TALI

Built	1995 / 1998
Shipyard	Finnyards Oy, Finland
IMO number	9113018/9173692
Class	Lloyd's @ 100 A1, General Cargo
Ice class	1A Super
Flag	Finnish
Port	Helsinki
DWT	13,340
GT / NT	10,098 / 4,597
Cubic capacity	16,786 m³ / 592,881 cbft
LOA	137.15 m
LBPP	129.00 m

Beam	21.60 m
Draft	8.19 m SSW
Moulded depth	11.00 m
TPC	27.00 mt
Height wl-hc in ballast	8.50 m
Airdraft from keel	42.00 m
Main engine	Wärtsilä, 6,250 kW at 450 rpm
Bow thruster	600 kW
Auxiliaries	3 diesel generators 660 kW each
Classification	Lloyd's Register
P and I club	Gard
Hatches	Electro hydraulic hatches folding type

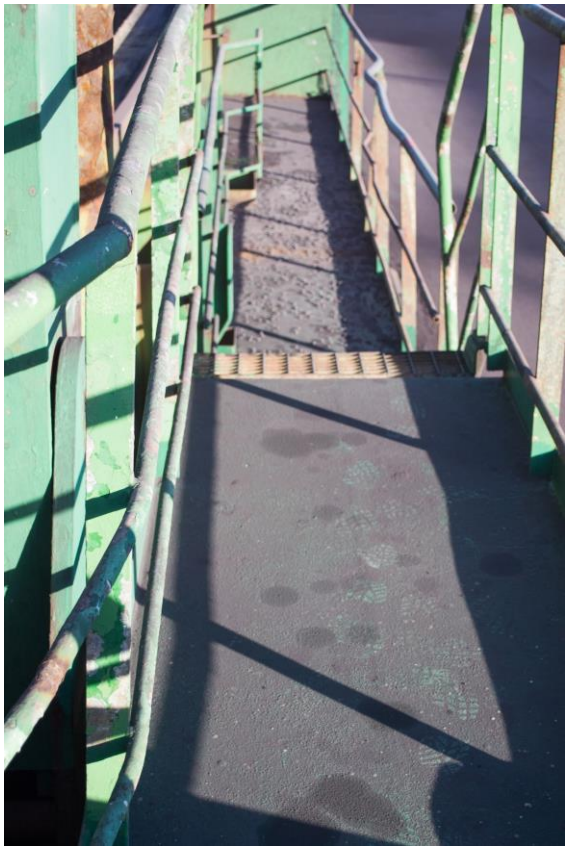
Cranes	Three electro-hydraulic cranes SWL 30 mton (hook), and SWL 25 mton with 12.5m³ grab. Grab outreach 24 m.	
Holds	2 double skin cargo holds	
Hold dimensions		
no 1.	40.00x17.60x12.20 m	8,458 m³ / 298,736 cbft
no 2.	39.20x17.60x12.20 m	8,328 m³ / 294,145 cbft
Deck load	1.75 mt/m²	
Tanktop strength	20.30 mt/m²	

Particulars are given in good faith but without guarantee.

IDS Specification

- 24/7 data gathering
- 3 areas with sensors
  - Aft
  - Fore, both sides
- Control unit with Starkice Cloud Service
  - Satellite/GSM connections available

- Routes & climatical conditions recorded
  - Various measurement types
- 24/7 visual data
  - Normal & nighvision used
- Remote controlled Starkice Cloud Service & Operations Team used to gather data and fine-tune software settings of De-icing




WINTERIZATION
CONTROL PANEL
-4.0
09/02/2017
13:45
HEATING ON
HEATING OFF
MAIN SWITCH
STARBOARD
FAULT
STARKICE

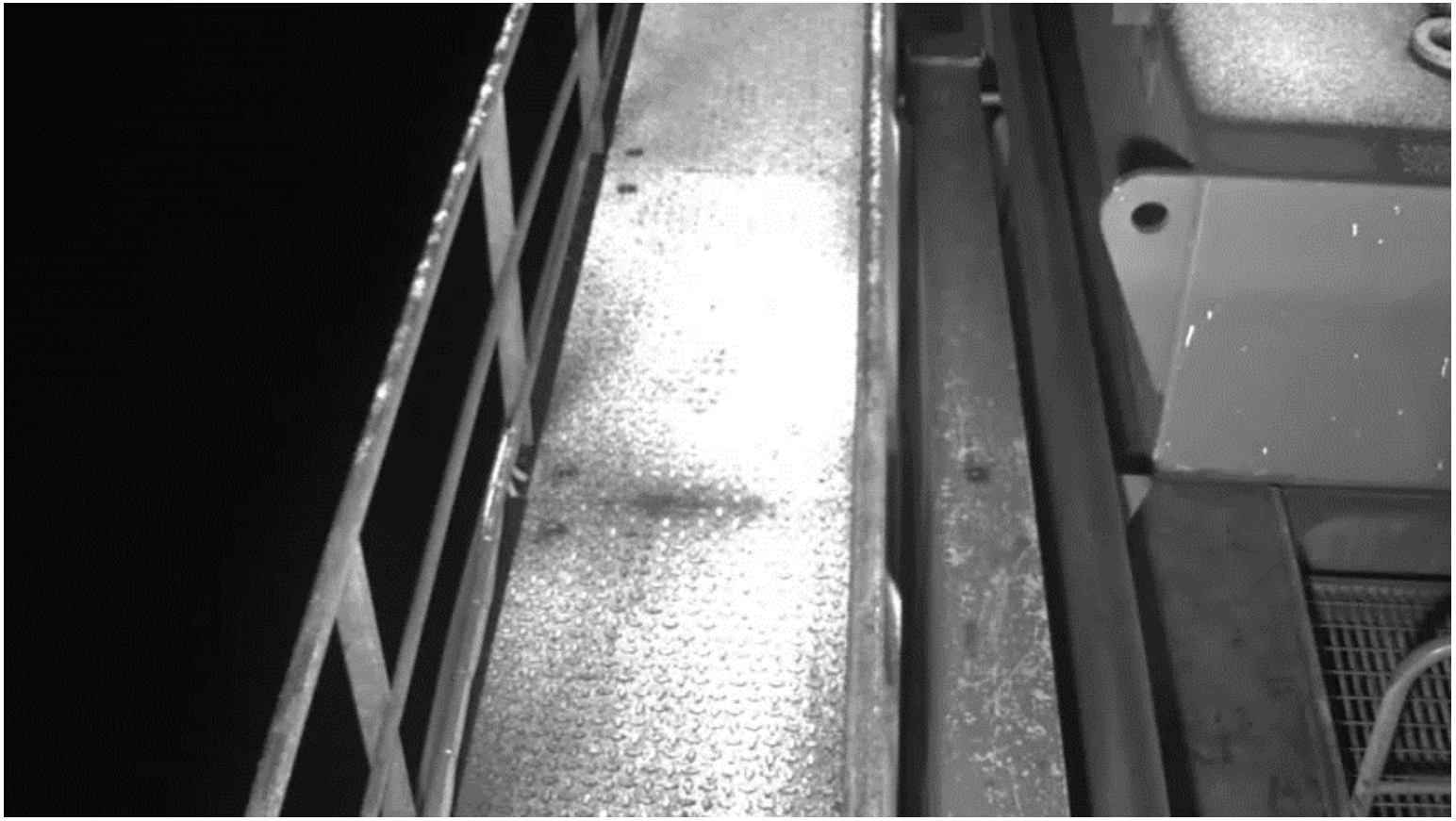
21h

4h

4,5h

4h

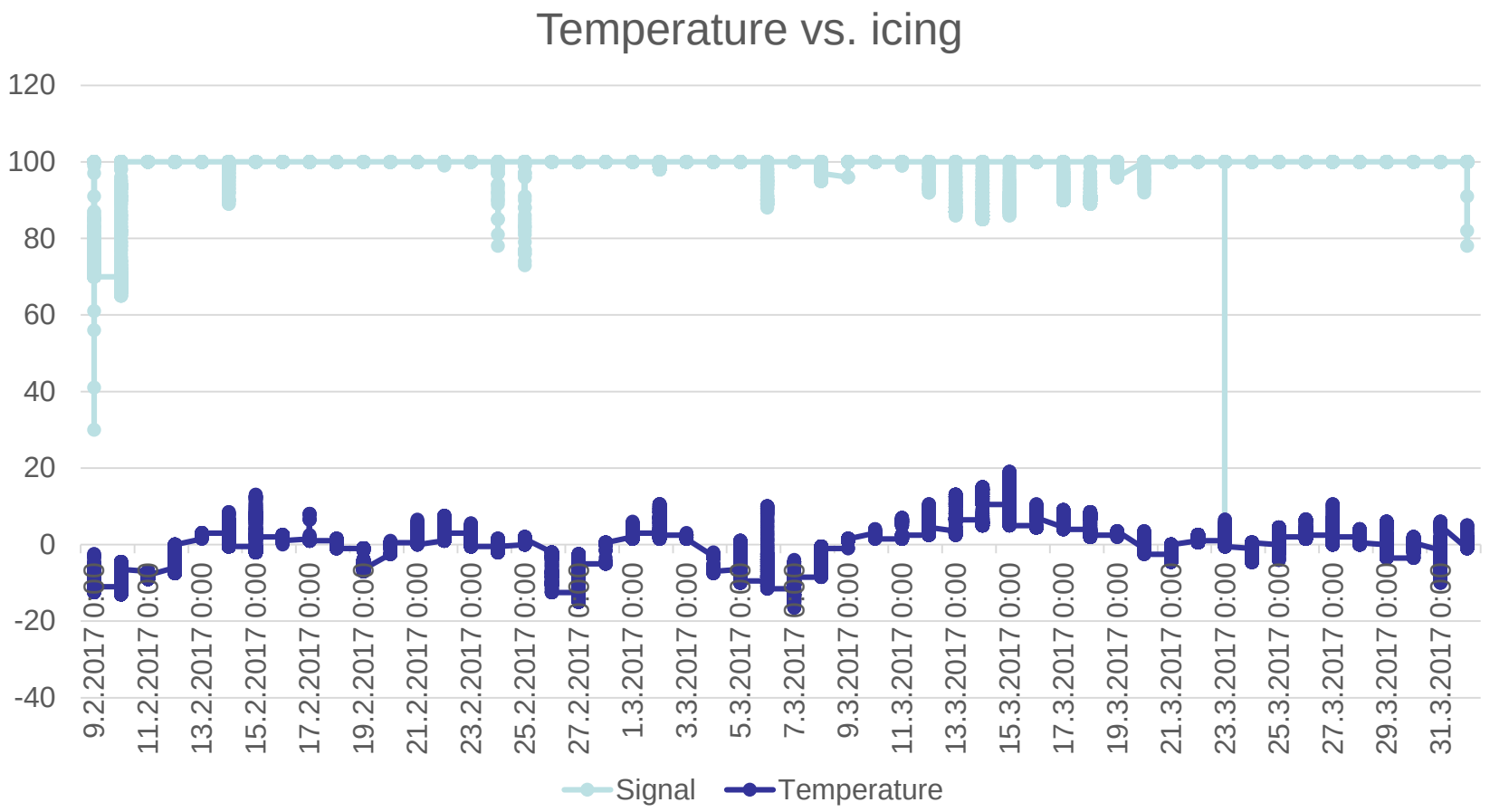
4h



5h

Findings

- Temperature is not the main driver for icing on structures
- Energy savings are signifigant
  - We started by -30% with IDS →OPEX
  - Peak power savings 50-75%, depending from site conditions & owner requirements → cycles→ CAPEX
  - ROI is very tempting, depending on size
- Crew usage can be minimized on manual ice removal, automation has proven track record
- Installation time of modern system is quick→ Can be done during normal harbor visit → even multi-vessel usage


Temperature vs. icing
120
100
80
60
40
20
0
-20
-40
9.2.2017 0:00
11.2.2017 0:00
13.2.2017 0:00
15.2.2017 0:00
17.2.2017 0:00
19.2.2017 0:00
21.2.2017 0:00
23.2.2017 0:00
25.2.2017 0:00
27.2.2017 0:00
1.3.2017 0:00
3.3.2017 0:00
5.3.2017 0:00
7.3.2017 0:00
9.3.2017 0:00
11.3.2017 0:00
13.3.2017 0:00
15.3.2017 0:00
17.3.2017 0:00
19.3.2017 0:00
21.3.2017 0:00
23.3.2017 0:00
25.3.2017 0:00
27.3.2017 0:00
29.3.2017 0:00
31.3.2017 0:00
Signal
Temperature

- Optimization of pre-made software settings can reduce energy consumption even more than 70%
- Safety & operability is improved by automation
- Deck mounted equipment, if winterized by electrical system, can be controlled by same system & sensors
- Gangways and rescue zones should have automated anti-icing or constant watch (if no automation/ warning system installed)
- Ice accumulation can be rapid, but heated pads can cope with 10-12 minutes response time (200-1200W/m2) from first icing detection
- Modern sensors and controllers are reliable

Working conditions

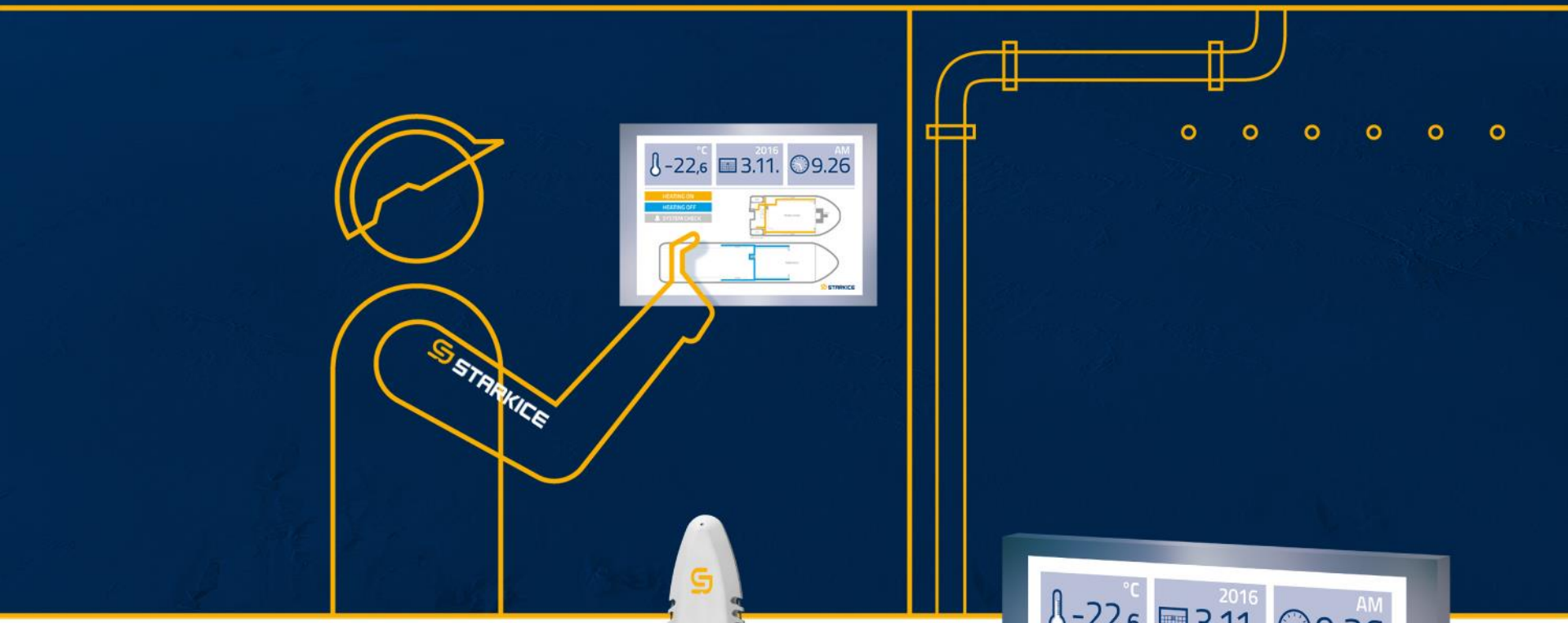
- In difficult conditions manual removal of ice is impossible
- Comfort & Safety & Usability of most areas can be signigantly improved


-4.0
13:45
STARKICE

STARKICE

INNOVATIVE SOLUTIONS + PRODUCTS

THE MOST INTELLIGENT WINTERIZATION SYSTEM ON THE MARKET



THE STARKICE SYSTEM is based on intelligent sensors, a control center, logic centers, graphical display units, and heating elements. The system provides a notification about freezing conditions, and activates the heating elements in an optimized manner. The system collects and saves information on the conditions and usage which can be transferred to any endpoint device.

STARKICE SYSTEMS IMPROVE ENERGY EFFICIENCY AND SAFETY

°C
-22,6

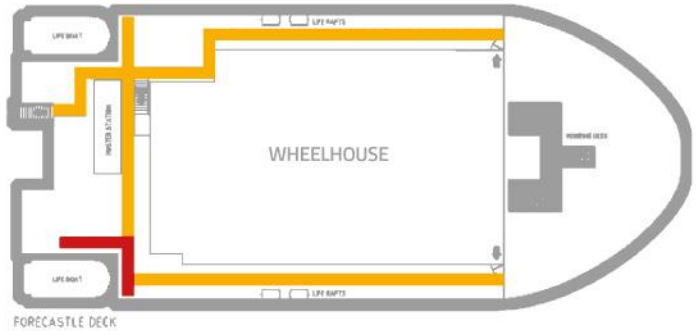
2016
3.11.

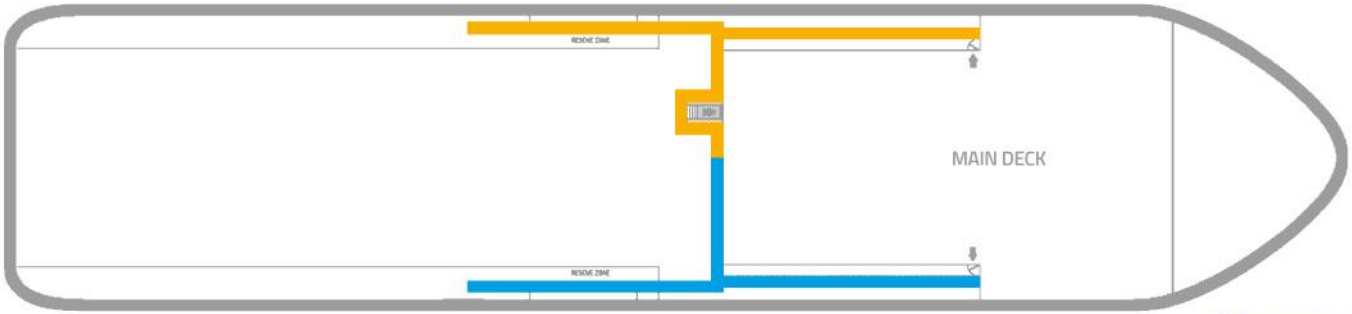
AM
9.26

HEATING ON

HEATING OFF

SYSTEM CHECK





STARKICE

DECKS AND PASSAGES

STAIRS

RAILS

SUPERSTRUCTURE

HATCHES

DOORS

PIPES AND TANKS

HELIDECK

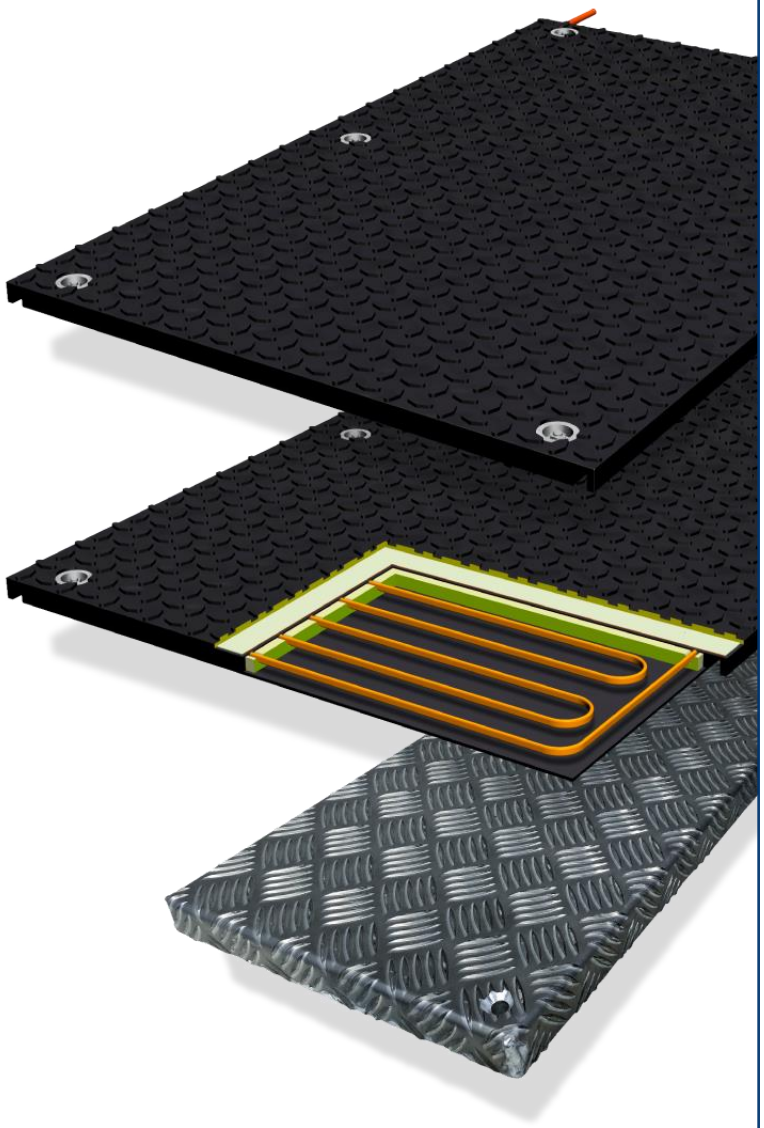
Harbors


PILOT


26-02-2018 21:43:51
KAMERA2


08-08-2018 16:54:24
PILOT
KAMERA2

STARKICE POLARPAD™



Starkice Polarpad is the most cost-efficient, durable, and reliable deck and stairs heating solution for marine and offshore use. Polarpad has been specially developed for cold conditions and it meets all standards of the field. Polarpad is made to endure heavy use, chemicals, and impacts. The optimized thermal conductivity of the surface ensures efficient de-icing.

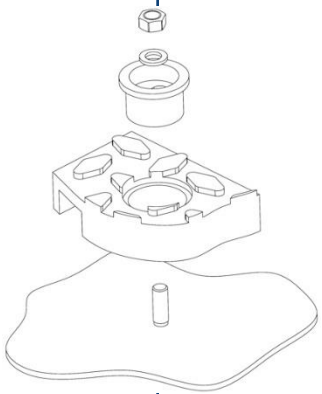
Due to the unique surface structure, slipping is avoided on moist surfaces and the metal reinforcement in the internal parts of the system protects the heating source from external impacts. The flexible and heat-insulating base layer makes the system the most energy-efficient heating system on the market. For safety and maintenance purposes, the power supply cables have been embedded in the lower surface of the structures for chaining.

The surface materials used consist of polymer or sea aluminum. Fastening mechanisms can be selected from the Starkice Fix stud/mag selection.

STARKICE MAG AND STUD

In order to make installing Starkice Polarpad easier, we have developed innovative fastening mechanisms for fastening the product on metal surfaces. With Starkice Mag brackets, you can install the elements in exactly the correct place, after which you simply lock the Starice Mag bracket in place with a special key. No drilling or welding required.

Starkice Polarpad can be installed by using the traditional methods as well, by using bolts welded on the deck. The bolts can be welded while the element is in place, after which you just need to tighten the Starkice Stud bracket.



CE

STARKICE HEATED BLANKETS

The Starkice heated blankets have been designed for protecting and providing temporary heating. Due to its insulated structure, the Starkice heating blanket is efficient and economical.

Due to its easy installation and transferability, the blanket can be used for protecting and heating various targets, according to the current need.

The heated blankets come in various power and size options. After use, they can be easily stored in a small space.

CONTACT

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STARKICE