



## CASE STUDY Common Rail Fuel Injection Retrofit on Medium-Speed Marine Diesel Engine



*"The HEINZMANN Common Rail System has proven its excellent performance and reliability under challenging and harsh operating conditions. All objectives have been met to our fullest satisfaction."*

Albert Hagander, Technical Manager,  
Sjöfartsverket Rederi, Sweden

### Project Challenges

The Swedish Maritime Administration (SMA) examined the technical potential to equip their 40-year old icebreaker YMER with an advanced electronic fuel injection system to meet the environmental guidelines and to make the vessel more efficient.

### The HEINZMANN Solution

The HEINZMANN feasibility study showed that common rail retrofit was the ideal solution to meet SMA's requirements regarding operation cost and emission reduction.

An on-site survey of the five main Pielstick 12 PC2.2V engines generating 3.5 MW each including on-engine measurements was performed. To prove the concept, the first engine was successfully converted to common rail and tested. After a two-year test period under harsh operating conditions, the conversion of the remaining four engines followed.

The project has shown that the HEINZMANN Common Rail Fuel Injection System is a cost-effective and viable universal solution for retrofitting older marine engines.

### CUSTOMER



### Sjöfartsverket Rederi – Swedish Maritime Administration (SMA)

- ▶ Country: Sweden
- ▶ Industry: Marine
- ▶ Founded in: 1969
- ▶ Employees: 1.200
- ▶ Website: [www.sjofartsverket.se](http://www.sjofartsverket.se)
- ▶ Ship: Icebreaker YMER built in 1975

### ENGINE TYPE

Pielstick 12 PC2.2V, 5 engines, 3.5 MW each @ 485 rpm, diesel-electric transmission, marine diesel fuel

## Effects on Ship Operation

Due to improved combustion conditions with HEINZMANN Common Rail Retrofit, engine efficiency is increased in the entire operating range resulting in significant fuel savings. Particulate emissions and deposits in the exhaust system are reduced. A smooth combustion profile combined with cylinder balancing leads to low component load, wear and vibration with a positive effect on lifetime.



Vibration measurements show a smoother engine run after the conversion

**During three years of operation without problems the reliability of the complete system has been proven under harsh conditions.**

## Delivered System Components

### Hydraulic system components

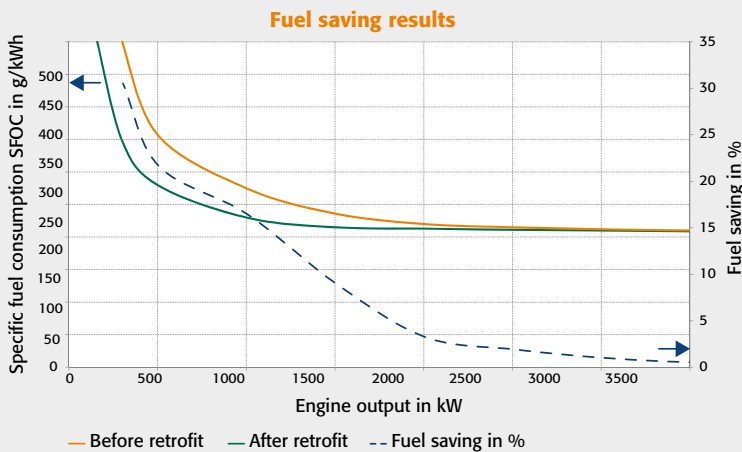
- ▶ High-pressure pump HDP-K4
- ▶ Fuel injectors ICR-DS 300
- ▶ Flow limiters
- ▶ Safety valve RPLV
- ▶ Complete high-pressure piping
- ▶ System mounting kit

### Common rail control system components

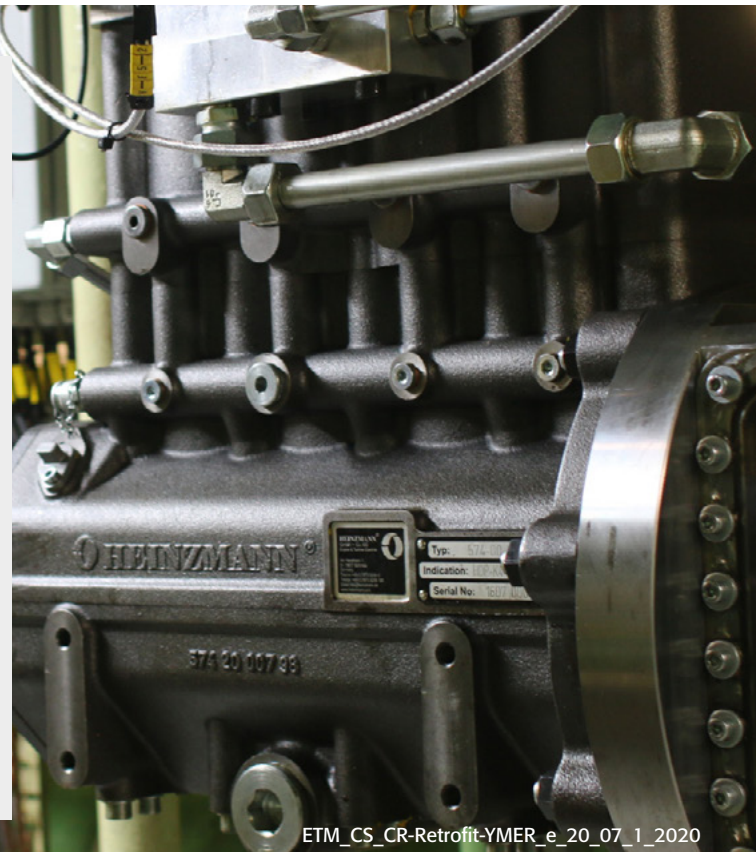
- ▶ Control unit MVC 01-20
- ▶ Complete cable harness
- ▶ Set of sensors (pressure, temperature)
- ▶ Speed sensing unit
- ▶ Mounting kit for cam sensor
- ▶ Communication software DcDesk
- ▶ Local operating panel with display
- ▶ Independent safety shutoff system based on DC 8 governor

## Fuel Saving Results

Load dependent specific fuel consumption before and after Common Rail Fuel Injection Retrofit



Data acquisition performed by independent research partner SSPA, Sweden ([www.sspa.se](http://www.sspa.se))



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