Information to ASB2013/02/18

Containment Risk for Turbochargers with Grey Cast Iron Casings

MAN Diesel & Turbo SE

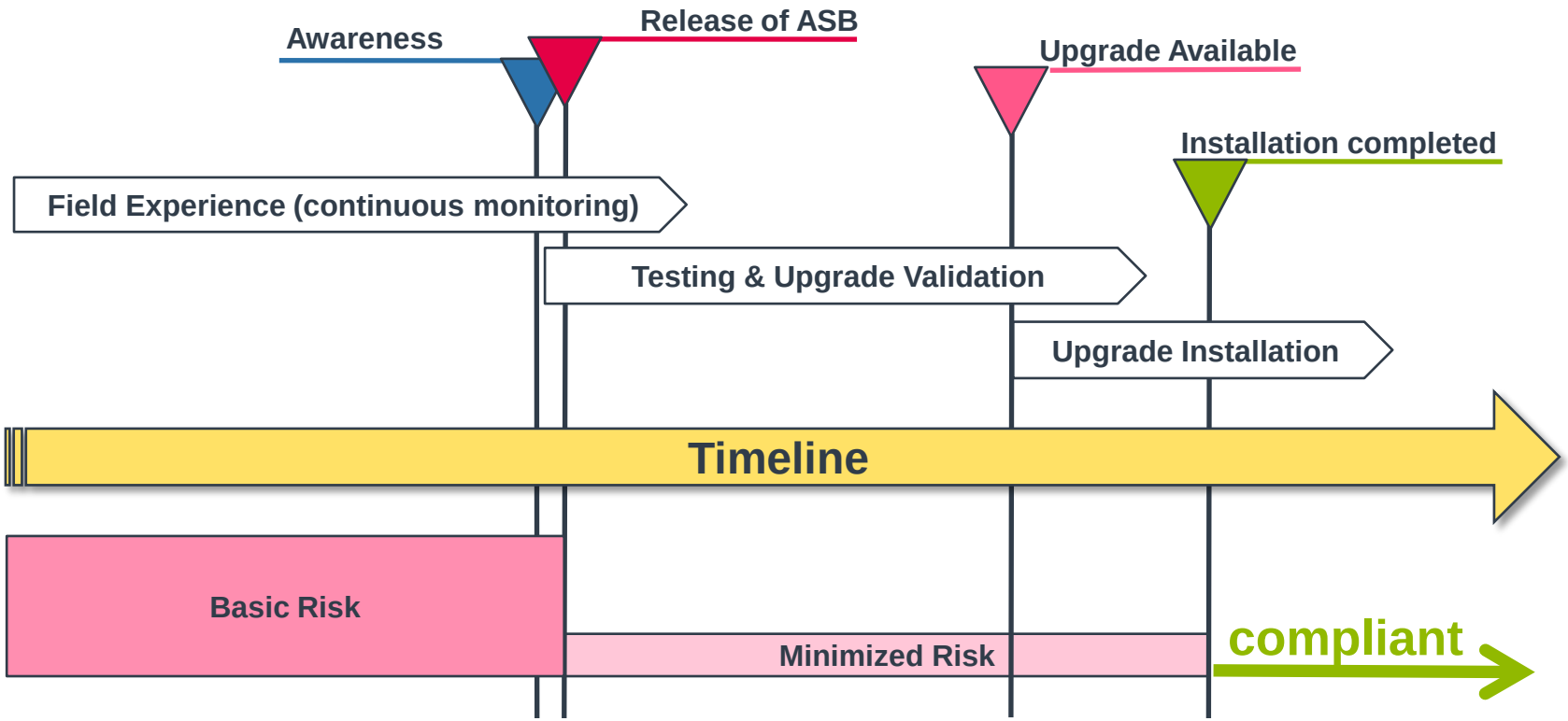
Business Unit Turbocharger

Information to ASB2013/02/18

Agenda

Information to ASB2013/02/18

Timeline



Grey Cast Iron Casings

Field Experience / Material Properties

Grey Cast Iron Casings

Field Experience / Material Properties

MS0004 (GG25) Grey Cast Iron

Mechanical properties				
Kind of test piece	**< d [mm] ≤**	**Rm [N/mm²]**	**Rp1 [N/mm²]**	**A min [%]**
Mechanical Analyzing Method: Tensile test				
		250.0 - 350.0	228	0.3 - 0.8
Anticipated values in casting	5.00 - 10.00	250.0		

MS0005 (GGG40) Nodular Cast Iron

Mechanical properties			
< d [mm] ≤	Rp0,2 [N/mm²]	Rm [N/mm²]	A min [%]
Mechanical Analyzing Method: Tensile test			
0.00 - 30.00	250	400.0	15.0
30.00 - 60.00	250	390.0	14.0
60.00 - 200.00	240	370.0	11.0

Information to ASB2013/02/18

Potential Risk of Grey Cast Iron

Grey cast iron casings have been a common standard in the industry in the past.

MAN Risk Evaluation according to today's standards:

- Severity of injury
  – In the extreme rare event of casing breakage fatal injuries possible
- Possibility of avoidance
  – Not possible to move away from the turbocharger due to the speed at which the hazard occurs (without indications)
- Length of stay in danger zone
  – Several times a day for inspection and maintenance
- Incidence rate
  – 1 incident within > 3,100 operating years

→ **Potential risk!**

→ **Inform customers to minimize risk!**

Information to ASB2013/02/18

MAN Product Safety Policy

Importance of HSSE

Health, Safety, Security, Environment
is an integral part of MAN Diesel & Turbo‘s company policy and corporate governance.

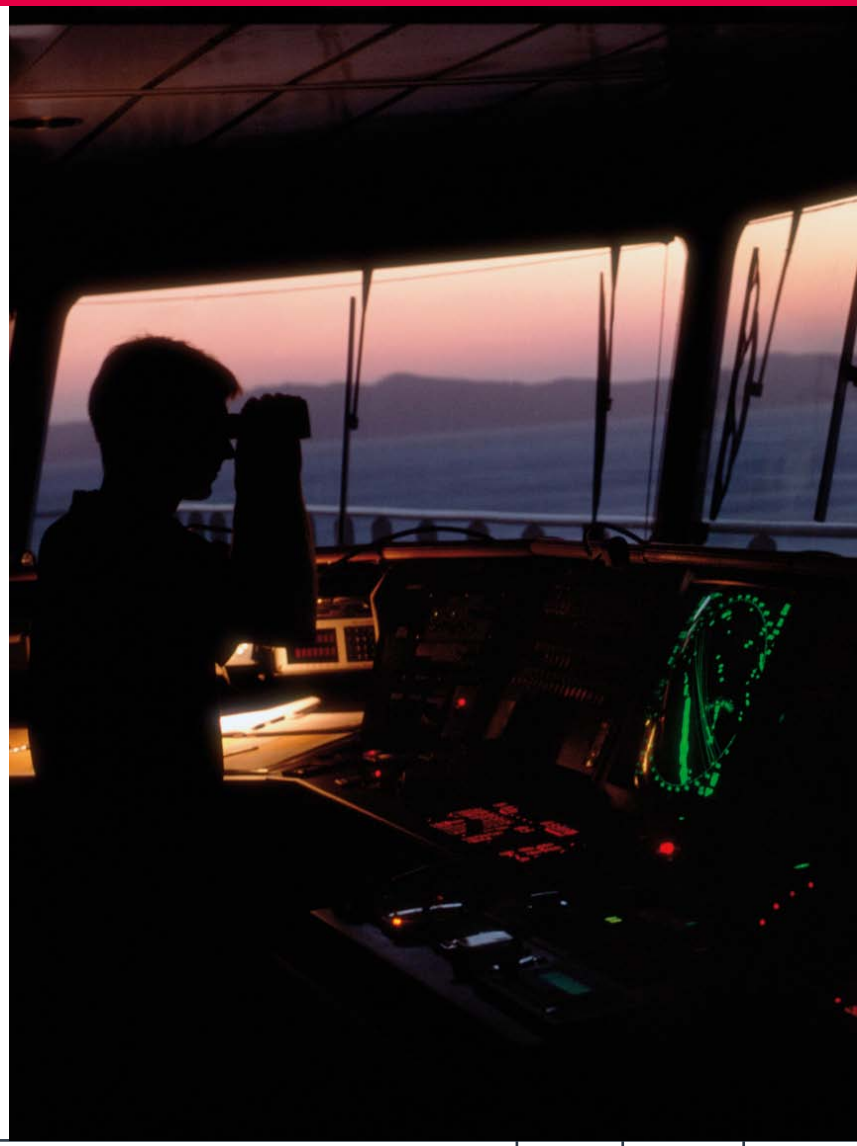
- Environmental impairment
- Safe working places
- Safe products

Safe Processes

Monitoring

Timely Reaction

SAFETY FIRST!



Information to ASB2013/02/18

Affected Products

Previous generation turbochargers with grey cast iron casings of type

NR12, NR14, NR15, NR17, NR20, NR24, NR26, NR29, NR34
NA34, NA40, NA48, NA57, NA70

How can grey cast iron casings be identified?

It is not possible to distinguish traditional grey cast iron material from modern nodular iron casings by visual inspection. Owners and operators of concerned Turbochargers are requested to contact MAN Diesel & Turbo and provide:

- turbocharger work number
- name of turbocharger maker
- year of production

of the turbochargers in his fleet.

MAN Diesel & Turbo will check and reply in writing.

Information to ASB2013/02/18

ASB Handling Process

MAN	▪ Release of ASB2013/02/18
Customer	▪ Information about turbocharger work number, name of turbocharger maker and year of production
MAN	▪ Identification of affected turbochargers and return information
Customer	▪ Implementation of short term measures for risk minimization according to ASB2013/02/18
MAN	▪ Information upon availability of an upgrade kit ▪ Coordination of delivery of kits and modification of tc

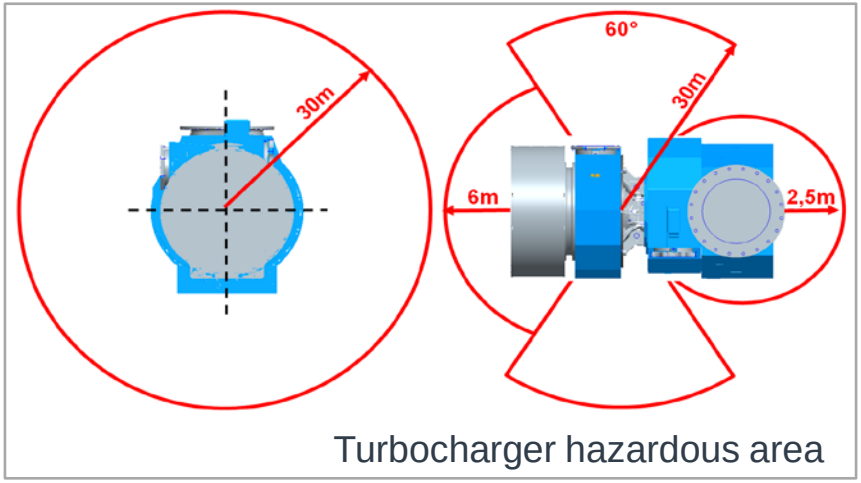
MAN is developing upgrade kits and retrofit solutions for affected NA and NR types

Containment proven turbocharger

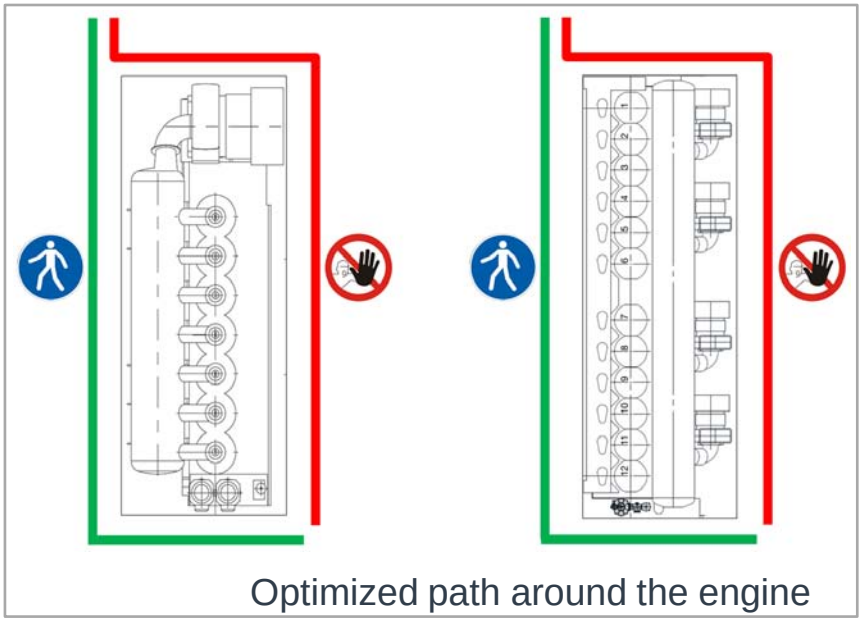
Information to ASB2013/02/18

Short Term Measures for Risk Minimization

- Never enter the turbocharger hazardous area as long as the engine is in operation, unless unavoidable.
- Minimize your stay in the engine room and
  operate your engine exclusively from the engine control room.
- Do not use the operating panel which is attached to the engine close to the turbocharger.
- Wear appropriate protective clothing, protective goggles, safety boots, hard helmet etc. as recommended in the Instruction Manual of your turbocharger.
- In any case please optimise your path through the engine room in order to minimize your stay in the hazardous area.



Turbocharger hazardous area



Optimized path around the engine

Information to ASB2013/02/18

Short Term Measures for Risk Minimization

MAN Diesel & Turbo recommends to change the maintenance work as follows.

Work item	Description in the manual	Recommendation
901 / 501	Inspection for abnormal noise and vibrations	Stay out of the hazardous area for this inspection. In case of an abnormal noise stay away from the turbocharger, stop the engine immediately, identify and eliminate the source of the noise before re-starting the engine.
903	Check turbocharger and system pipes for leaks	Carry out this work only when engine is stopped. Oil leaks as well as gas leaks can also be identified by residues when the engine is stopped.
905 / 508	Check all the fixing screws, casing screws and pipe connections for tight fit	Carry out this inspection only when the engine is stopped.
911 / 504	Turbine dry cleaning	Use it regularly at reduced engine load according to the description of turbine wet cleaning.
913 / 503	Turbine wet cleaning	Use it regularly at reduced engine load according to the manual.
915 / 502	Compressor wet cleaning	Stop using the cleaning device
917 / 505	Cleaning of air filter	Carry out this work only when engine is stopped. Make sure that the filter mat is always installed properly and undamaged. In case a U-pipe manometer is installed on your turbocharger stop using it.
506	Inspection of sealing air valve	Carry out this work only when engine is stopped.
	Jet Assist	Ensure that jet-assist pressure does not exceed 4 bar (as per operating manual)

Information to ASB2013/02/18

Medium Term Measures for Risk Minimization

Upgrade Kit

MAN Diesel & Turbo is developing upgrade solutions with highest priority.
The upgrade kits will be released step by step as soon as they are available.
Once MAN Diesel & Turbo has received the customer's fleet information, MAN Diesel & Turbo will contact the customer upon availability of an upgrade kit for his specific turbocharger(s).

Timeline for Upgrade Solution

MAN Diesel & Turbo is already in the process of developing upgrade solutions for NA and NR turbochargers. Depending on the individual type, some upgrades might take longer than 6 months, some however will be available immediately. Please contact MAN Diesel & Turbo for detailed information.

Information to ASB2013/02/18

Medium Term Measures for Risk Minimization

Retrofit

In most cases a turbocharger retrofit with a new TCR or TCA turbocharger is a viable option with the additional benefit of improved engine performance.

Please contact MAN Diesel & Turbo for detailed information.

Retrofit Example:

MAN Diesel & Turbo engine 25/30

Before Retrofit: NR26/R

After Retrofit: TCR20-4

Information to ASB2013/02/18

Contact

Our Service Department is always at your disposal:

MAN Diesel & Turbo SE
86224 Augsburg
Germany

Hotline: +49 821 322 4402
Fax: +49 821 322 49 2830
e-mail: TC-ASB-Feedback@mandieselturbo.com

Thank you for your attention.