

Action code: **AT FIRST OPPORTUNITY**

Load-up Program
New load-up recommendations
for bore sizes 80 cm and up

SL09-503/JAP
 February 2009

Concerns

Owners and operators of MAN B&W two-stroke marine diesel engines.
 Type: MC/MC-C and ME/ME-C
 Bore sizes 98, 90 and 80 cm

Short summary

New large bore load-up recommendation:
 80→100% SMCR speed (rpm) in 90 minutes with a break point after 30 minutes.

Dear Sirs

We have updated our minimum load-up recommendations for engines with bore sizes 98, 90 and 80 cm.

Our existing load-up program recommendation (from 90→100% in 30 minutes) is still valid for engines with bore sizes from 70 cm and down. Engines with these smaller bore sizes will, however, also benefit from applying the new recommendations.

Our new minimum recommendations are these two 90 minutes load-up programs:

Engines with Fixed Pitch Propeller	
Load intervals, % SMCR* speed (rpm)	Time in minutes
80 → 90	30
90 → 100	60

Engines with Controllable Pitch Propeller	
Load intervals, % SMCR* power	Time in minutes
50 → 75	30
75 → 100	60

* SMCR = Specific Maximum Continuous Rating

For engine control systems without break point option, an alternative 90 minutes, linear load-up program can be used.

Please refer to your engine control system instruction manual or your engine control system supplier for implementation instructions.

Any questions or inquiries regarding the load-up program can be directed to leo@mandiesel.com

Yours faithfully


Mikael C Jensen

Vice President, Engineering


Stig B Jakobsen

Senior Manager, Operation



Head office (& postal address)
MAN Diesel
 Teglhølmegade 41
 2450 Copenhagen SV
 Denmark
 Phone: +45 33 85 11 00
 Fax: +45 33 85 10 30
mandiesel-cph@mandiesel.com
www.mandiesel.com

PrimeServ
 Teglhølmegade 41
 2450 Copenhagen SV
 Denmark
 Phone: +45 33 85 11 00
 Fax: +45 33 85 10 49
PrimeServ-cph@mandiesel.com

Production
 Teglhølmegade 35
 2450 Copenhagen SV
 Denmark
 Phone: +45 33 85 11 00
 Fax: +45 33 85 10 17
manufacturing-dk@mandiesel.com

Forwarding & Receiving
 Teglhølmegade 35
 2450 Copenhagen SV
 Denmark
 Phone: +45 33 85 11 00
 Fax: +45 33 85 10 16

MAN Diesel
 Branch of MAN Diesel SE, Germany
 CVR No.: 31611792
 Head office: Teglhølmegade 41
 2450 Copenhagen SV, Denmark
 German Reg.No.: HRB 22056
 Amtsgericht Augsburg

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Background

Through the years we have experienced some unlucky cases of rapid cylinder liner wear, also known as scuffing, during and following engine load-up.

These unwelcome incidents have led us to investigate a safer load-up procedure. Our research has revealed that loading up with caution and patience is the best way to prevent such costly incidents.

MAN B&W engines are designed and manufactured to withstand long-term and constant heavy load. However, as with all other engines, service life and service reliability depend heavily on how engine load-up is carried out.

The most significant load-up issue is the mechanical and thermal load causing deformations of piston crown, cylinder liner and piston ring. These deformations affect the shape of the piston ring running surface, which is designed to adapt to deforming cylinder components. If the load changes too fast, however, the piston ring may lack sufficient time to adapt. The outcome can be excessive cylinder liner wear that, in severe cases, may develop into cylinder liner scuffing.

Load control

MAN B&W two-stroke engine load-up is controlled in three ways. We recommend all operators to ensure that these three limiters are set and used correctly:

P_{scav} limiter

The p_{scav} limiter ensures sufficient scavenge air supply for maintaining an efficient and smoke-free combustion. The p_{scav} limiter balances the air/fuel ratio by limiting fuel injection in case of insufficient air supply. Insufficient air supply is most common below 35% engine load, where the auxiliary blowers are running and the turbocharger not yet has reached sufficient capacity.

Torque limiter

The torque limiter prevents excessive torque/mechanical overload by ensuring that the engine load never exceeds the boundaries of the load diagram.

Load-up program

The load-up program prevents mechanical and thermal overload during load-up and ensures sufficient time for the auxiliary system to adapt, by controlling the load-up rate.

New load-up recommendations

The recommended load-up program depends on the vessel's propeller type: Fixed Pitch Propeller (FPP) or Controllable Pitch Propeller (CPP). Please note, that these recommendations are our minimum recommendations.

Fixed Pitch Propeller

For engine plants with Fixed Pitch Propeller (FPP), load up is measured in percent SMCR* speed (rpm). Our recommended FPP load-up program:

Fixed Pitch Propeller	
Load intervals, % SMCR* speed (rpm)	Time in minutes
80 → 90	30
90 → 100	60

Table 1: Recommended FPP load-up program

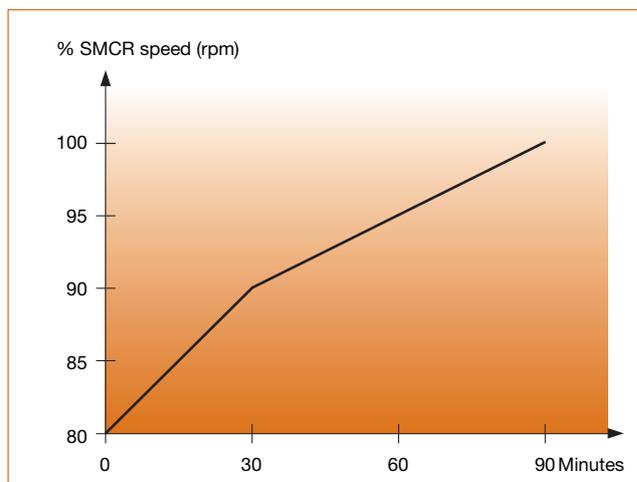


Fig. 1: Recommended FPP load-up program

Controllable Pitch Propeller

For engine plants with Controllable Pitch Propeller (CPP), load up is measured in percent SMCR* power. Our recommended CPP load-up program:

Controllable Pitch Propeller	
Load intervals, % SMCR* power	Time in minutes
50 → 75	30
75 → 100	60

Table 2: Recommended CPP load-up program

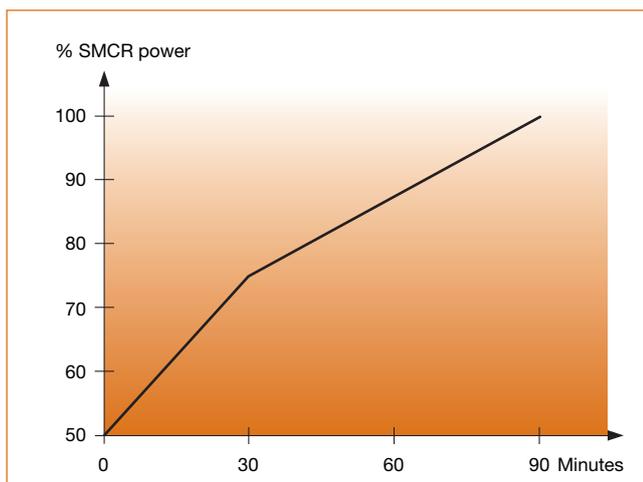


Fig. 2: Recommended CPP load-up program

ECS without break point option

If the engine control system cannot execute our recommended load-up program, these load-up programs without break point can be used:

Fixed Pitch Propeller, without break point	
Load intervals, % SMCR* speed (rpm)	Time in minutes
80 → 100	90

Table 3: FPP load-up program without break point

Controllable Pitch Propeller, without break point	
Load intervals, % SMCR* power	Time in minutes
50 → 100	90

Table 4: CPP load-up program without break point

Run-down

MAN B&W two-stroke engines can be run down instantly to any load level without any restrictions, and we do not specify a specific run-down program. We do, however, recommend always to conduct a controlled and cautious run-down.

Delayed reset

Due to the slow cool-down of the engine, the load-up program does not reset after a very short run-down. Instead, the load-up program will perform a 15 minute countdown when the engine is run down.

Example

An FPP plant is run down instantly from 100% rpm to just below 80%. Full load is reinitiated after 5 minutes. During the 5 minutes below 80% rpm, the load-up program will perform a background countdown.

Counting down from 100→80% rpm in 15 minutes, the load-up program will reach 93% rpm in 5 minutes (approximately).

When reinitiating full load after 5 minutes, the engine will load up instantly to 93% rpm. Load-up from 93→100% rpm will follow the load-up program. Consequently, the load-up program hereafter will allow the engine to load up from 93→100% rpm in approximately 42 minutes.

Figure 3 shows background countdown (dotted line) and the load curve example (full line).

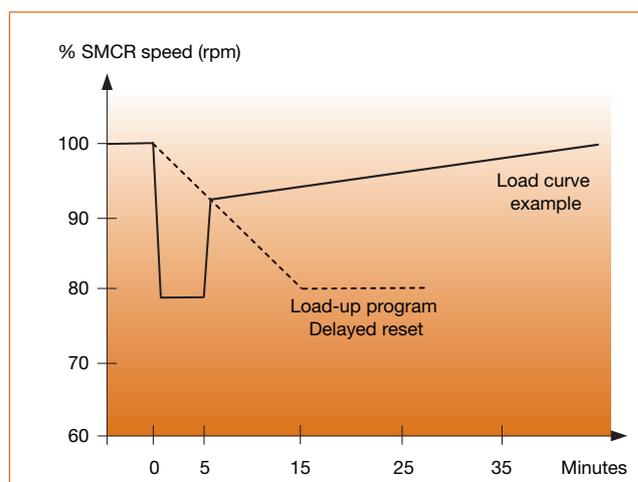


Fig. 3: FPP load-up program counting down. Example.

Increase limiter button

The increase limiter button cancels the load-up program and increases the p_{scav} and torque limiter settings by 10%.

Small bore

This service letter is on load-up recommendations for engines with bore sizes 80 cm and up. These new load-up recommendations will, however, also be beneficial for engines with bore sizes 70 cm and down.

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