

Subject:

## Cracking of cylinder cover cooling jacket for 50 & 60 MC, MC-C engines

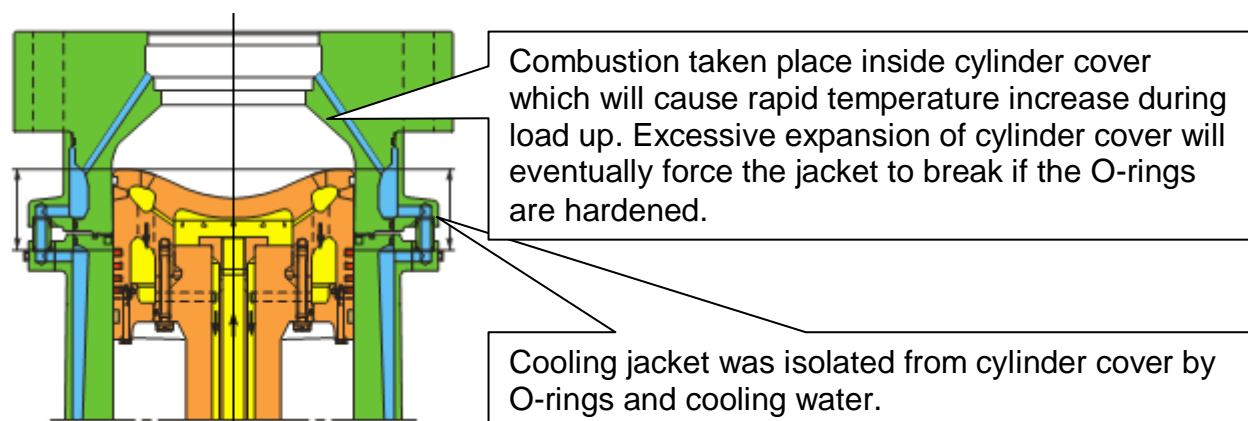
Dear Sirs,

In recent years, there were many incidents of cooling jacket cracked worldwide especially for 50 and 60 MC, MC-C engine type. We had attended some of those cases for investigation.

Throughout our analysis we found followings were in common among cases involved:

- A. Cooling jackets cracked while load change (speed up)
- B. Heavy fouling in the cooling chamber.
- C. Rubber O-rings aging.
- D. In some cases the jacket cooling water thermostatic valve does not respond fast enough resulting rapid temperature change.
- E. Crack occurred on engines from different makers include makers from Japan.
- F. Crack occurred after 5-6 years vessel in service.

The design of cylinder cover cooling chamber had been changed from a welded ring to a thin wall cooling jacket (the thickness of the jacket wall is about 11 mm). The difference between a welded cooling ring and cooling jacket is that heat can easily transferred to the welded ring through direct contact but not through rubber O-rings (jacket type). In this regard, the temperature deviation between cylinder cover and jacket can be excessive during load up and the expansion force will BE transferred to the cooling jacket through less elastic (aged) O-rings and eventually cause the jacket to break.



Apart from the above root cause of jacket breakage, followings will cause deterioration of situation:

Scale formation in the cooling jacket reduces the heat transfer rate further that introduce extra thermal overload.

Slower response or malfunctioned thermostatic valve in jacket cooling water system will adversely affect the thermal load.

Rapid load change (speed increase) may be the last factor contributes to jacket breakage especially when fouling to the hull/propeller increases.

Although it may appeared like breakage is related to load change, problem with thermostatic valve and/or cooling water treatment, the root cause is still the aging O-rings and deviation in temperature between cylinder cover and jacket. However, if engine is maintained well with regards to above the jacket breakage may be postponed but unlikely avoidable.



In order to prevent cracking cooling jacket from happening, we recommend:

**Remove the cooling jacket whenever cylinder unit is to be overhauled. Carry out cleaning of the cooling space and renew the O-rings.**

In addition to the above, followings should also be taken cared:

Jacket cooling water must be treated with correct inhibitors. Carry out cleaning and descaling every 4-5 years as according to instructions in Operation manual.

Thermostatic valve in the jacket cooling system should be adjusted properly to reduce the temperature fluctuation during load change.

**Service Team  
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**Note:**

- This technical memo is intended to our clients only.
- The purpose of the Technical Memo is to share our point of view with our clients aiming to reduce engine operational cost and avoid incident from happening.
- All comments to this circular are welcomed
- Please send your feedback/opinion to [REDACTED]