

GENERAL MAINTENANCE INTRUCTION NO 31

GENERAL MAINTENANCE INTRUCTION ON PRESENTAION OF CRACK DEVELOPMENT OF CRACKS ON CYLINDERHEAD TMB VEHICLES

GENERAL

Cracking of cylinder heads on TMB engines has been reported. Over-heating of the engine through some disturbance in the cooling system is the main cause for crack developing in the cylinder heads. The factors leading upto such a condition can be:-

- (a) Insufficient coolent as a result of topping up the cooling system ;
- (b) Loss of coolent as a result of leaky hose pipes and joints ;
- (c) Non-fitment of radiator caps; or use of non-genuine makes;
- (d) Leaky radiators;
- (e) Improper operation of the thermostat;

2 The cylinder head is a small compact unit which has to accommodate numerous drillings and holes fir various mountings and passages for water and lubricating oil. Besides through the passages for the inlet and exhaust valve, cold air is sucked in and extremely hot air is expelled. Such considerable variations in temperature and prevailing high combustion temperature cause high thermal stresses which the cylinder head casting can normally withstand only as long as no additional unfavourable conditions are present.

MEASURES COR PRECAUTION OF DEVELOPMENT OF CRACKS

3 It is extremely important that if maximum life and serice is to be expected through the cylinder head it must be ensured that cooling system of the engine is at all times in perfect condition. The following preventive measures taken by the users will minimise changes of cracks developing in the cylinder head:-

- (a) The cooling water level should be checked and if necessary, topped up every morning before starting the engine. If it becomes necessary to top up too frequently the cause of loss of coolant should be investigated and rectifies.

(b) No vehicle should ever be driven without the original radiator cap. These radiator caps should be periodically checked. The rubber sealing ring when damaged or missing, must immediately be replaced to prevent evaporation or boiling of the cooling water. Also the spring loaded pressure valve inside the radiator cap must remain intact. Due to the pressure created by it, the water in the cooling system will not boil at 100 degree Calais as under normal atmospheric pressure, but only at a higher temperature. This is a great advantage, especially for climbing on his heads in the hot season.

(c) The driver should report an leakage-even seemingly insignificant ones from the radiator, hose pipes or the water pump, for immediate rectification. Cracked hard, bulged or otherwise deteriorated hoses should be replaced before they can lad to damage to the engine by bursting on the way. A slight leakage, barely visible while the engine is stopped, may become serious during driving on account of the vibrations and the pressure in the cooling system.

(d) An isolated case of overheating, however need not necessarily lead to the destruction of the engine. It is the drivers duty to keep a careful watch on the behaviour of the instruments. by doing so, not only could serious damage or high costs of repairs be prevented, but also safety during vehicle operation assured. A sudden rise of the cooling water temperature above the boiling point should indicate to him to stop the vehicle and investigate into its cause. The engine should be left to cool for at least 30 minutes. And only then should water be gradually filled in, if necessary.

(e) When the engine is overheating, the driver should report the incident at the first opportunity so that investigation can carried out by the field Wksp concerned for the reported defect.

(f) When the engine is reported with over-heating defect, Cylinder head should be removed, the valve springs checked for proper tension, the exhaust valve stems near the valve head freed from carbon and the injection nozzle tested. At the same time the cylinders can be checked for scoring marks. By doing so, loss of engine power due to jammed valves or weakened valve springs can be counteracted. Furthermore, the thermostat valve should also be checked to ensure that it is functioning correctly.

Note: - Sub Para (f) marked * will be carried out by Maintaining workshop only.

Be submitted to project HQ, following action will be taken at project HQ,

(a) When the failure is attribution to improper maintenance, negligence of the operator or user unit or due to service operating conditions, the failure will be further investigated and remedial if any will be suggested for prevention of such failure in future. All such will be finalized by project HQ under intimation to this HQ and the loss if any will be regularised by the unit concerned as directed by project HQ.

(b) When the premature failure is attributed to Base workmanship and poor quality of overhaul in GREF Base Wksp, additional copies of premature failure reports will be prepared and distributed as under:-

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|------|------------------------|---|--------------|
| i) | DGBR (E4/Tech) | - | one copy |
| ii) | Base Wksp concerned | - | one copy |
| iii) | Project HQ | - | three copies |
| iv) | Dependent Fd Wksp Wksp | - | one copy |
| v) | Unit concerned | - | one copy |

(c) SOI EME at Project HQ will arrange for the inspection of the eqpt and forward one copy of the premature failure report alongwith the copy of board proceedings with his remarks to HQ DGBR (E4/Tech) and Base Wksp, The remarks will include the following :-

- i) Cause of defect/malfunctioning/unsatisfactory functioning,
- ii) Can the defect be rectified by the dependent Field repair Wksp by undertaking extended repairs
- iii) Are all spares for the repairs available from the resources of the Project? If any, spares required are not available Part No, Nomenclature and Quantity of each required, will be mentioned,
- iv) Are further investigations necessary? If the answer is in the affirmative, recommendations will be made if detailed investigations can be completed by a representative from Base Wksp or evacuation to the Base Wksp will be necessary.

10. On receipt of premature failure report and Board proceeding from the project, Comdr, Base Wksp will endorse his comments on the premature failure report and forward the same to HQ DGBR (E4/Tech).

11. After receipt of the comments from SO I (EME) & Comdr Base Wksp, if it is felt that further investigations are essential, a fresh board will be ordered by HQ DGBR with at least one member each from the concerned Base Wksp and Project. Board may ask the unit to evacuate the eqpt to the Base Wksp for investigation and repairs and submit its proceeding to HQ DGBR. The responsibility to regularise the loss where it is established by the Board that the premature failure is due to poor workmanship or poor quality of overhaul will be that of the Base Wksp Concerned.

12. This supersedes all previous instructions on the subject.