

## 1. Cause

If flakes of burning or glowing carbon deposits drop into the oil sludge at the bottom of the scavenge air box, this sludge can be ignited and, if very combustible material is found here, serious damage can be done to the piston rod and the scavenge air box walls, the latter possibly causing a reduction in the tension of the staybolts.

Ignition of carbon deposits in the scavenge air box can be caused by:

- prolonged blow-by,
- “slow combustion” in the cylinder, owing to incorrect atomization, incorrect type of fuel valve nozzle, or “misaligned” fuel jets.
- “blow-back” through the scavenge air ports, owing to a large resistance in the exhaust system (back pressure).

To keep the exhaust resistance low, heavy deposits must not be allowed to collect on protective gratings, nozzle rings and turbine blades, and the back pressure after the turbocharger must not exceed 350 mm WC.

## 2. Warnings of Fire



### WARNING!

*If the auxiliary blowers do not start during low-load running (due to faults) unburned fuel oil may accumulate on top of the pistons. This will involve the risk of a **scavenge air box fire**.*

*In order to avoid such fire:*

- obtain permission to stop the engine
- stop the engine
- remove any unburned fuel oil from the top of the pistons
- re-establish the supply of scavenge air
- start the engine.



The switch for the auxiliary blowers should be in “**AUTO**”-**position** during all modes of engine control, i.e.:

- remote control
- control from engine side control console.



*If the engine stops on shut-down or if the operator commands a safety stop, the auxiliary blowers are stopped independently of the operating mode (automatic or manual).*

A fire in the scavenge box manifests itself by:

- an increase in the exhaust temperature of the affected cylinder,
- the turbocharger may surge,
- smoke from the turbocharger air inlet filters when the surging occurs,
- the scavenge air box being noticeably hotter.

If the fire is violent, smoky exhaust and decreasing engine revolutions will occur.

Violent blow-by will cause smoke, sparks, and even flames, to be blown out when the respective scavenge box drain cock is opened – therefore keep clear of the line of ejection.

Monitoring devices, see *Section 701-02*, in the scavenge air space give alarm and slow-down at abnormal temperature increase.

For CPP-plants with engaged shaft generator, an auxiliary engine will be started automatically and coupled to the grid before the shaft generator is disengaged and the engine speed reduced.

### 3. Measures to be taken

Owing to the possible risk of a crankcase explosion, do not stand near the relief valves – flames can suddenly be violently emitted.

1. Reduce speed/pitch to SLOW, if not already carried out automatically, *see above*, and ask bridge for permission to stop.
2. When the engine STOP order is received, stop the engine and switch-off the auxiliary blowers.
3. Stop the fuel oil supply.
4. Stop the lub. oil supply.
5. Put the scavenge air box fire extinguishing equipment into function. *See Plate 70405*. To prevent the fire from spreading to the next cylinder(s), the ball valve of the neighbouring cylinder(s) should be opened in case of fire in one cylinder.

**Do not open the scavenge air box or crankcase before the site of the fire has cooled down to under 100°C. When opening, keep clear of possible fresh spurts of flame.**

6. Remove dry deposits and sludge from all the scavenge air boxes. *See also Section 701-01*.
7. Clean the respective piston rods and cylinder liners, and inspect their surface condition, alignment, and whether distorted. If in order, coat with oil.

Repeat the checking and concentrate on piston crown and skirt, while the engine is being turned (cooling oil and water on).

Inspect the stuffing box and bottom of scavenge box for possible cracks.

8. If a piston caused the fire, and this piston cannot be overhauled at once, take the precautions referred to in *Section 703-02*.

If heating of the scavenge air box walls has been considerable, the staybolts should be retightened at the first opportunity.

Before retightening, normal temperature of all engine parts must be reestablished.

## 4. Scavenge Air Drain Pipes *Plate 70402*

To ensure proper draining of oil sludge from the scavenge air boxes, thereby reducing the risk of fire in the scavenge air boxes, we recommend:

- **Daily check during running**
- **Cleaning of drain pipes at regular intervals**

### 4.1 Daily checks during running:

1. Open the valve between the drain-tank and the sludge-tank.
2. Close the valve when the drain-tank is empty.
3. Check the pipes from flange **AV** to the drain-tank venting pipe:

Does air escape from the drain-tank venting pipe?	
<b>YES</b>	This indicates free passage from flange <b>AV</b> to the drain-tank venting pipe.
<b>NO</b>	Clean the pipes as described below, at the first opportunity.

4. Check the pipes from the test-cocks to flange **AV**:

Open the test cocks, one by one, between the main drain pipe and the scavenge air boxes and between the main drain pipe and the scavenge air receiver/auxiliary blowers.

Begin at flange **AV**, and proceed towards flange **BV**.

*Use this procedure to locate any blocking.*

Does <b>air</b> or <b>oil</b> blow-out from the individual test-cock?	
<b>AIR</b>	The scavenge air space is being drained correctly.  <i>This indicates free passage from the actual test-cock to flange <b>AV</b>.</i>

Does **air** or **oil** blow-out from the individual test-cock?



The scavenge air space is **not** being drained correctly.

*This indicates that the main drain pipe is blocked between the test-cock which blows-out oil, and the neighbouring test-cock towards flange AV.*

Clean the drain pipe as described below, at the first opportunity.

#### 4.2 Cleaning of drain pipes at regular intervals:

The intervals should be determined for the actual plant, so as to prevent blocking-up of the drain system.

Clean the main drain pipe and the drain-tank discharge pipe by applying air, hot water or steam during engine standstill.



*If leaking valves are suspected, dismantle and clean the main drain pipe manually.*

If hot water or steam is used, consider the risk of corrosion on the piston rods, if a valve is leaking.

1. Check that the valve between flange **AV** and the main drain pipe is open.
2. Close **all** valves between the main drain pipe and the scavenge air boxes, and between the main drain pipe and the scavenge air receiver/auxiliary blowers.  
If hot water or steam is used, it is **very important** to close all valves, to prevent corrosion on the piston rods.
3. Open the valve at flange **BV** on the main drain pipe.  
This leads the cleaning medium to the main drain pipe.
4. When the main drain pipe is sufficiently clean, open the valve between the drain-tank and the sludge-tank.  
This will clean the drain-tank discharge pipe.
5. When the drain tank discharge pipe is sufficiently clean, close the valve between the drain tank and the sludge tank.
6. Close the valve at flange **BV**.
7. Finally, open all valves between the main drain pipe and the scavenge air boxes, and between the main drain pipe and the scavenge air receiver/auxiliary blowers.