**Repair of cylinder block and casing of main engine MAK**

Scheme of the repaired parts of the cylinder block and casing, using the Metalock method. Numbering follows the sequence of restoration process.

1. **Broken old detail**
   - Due to the failure that was the only part of the cylinder block suitable for further use. New detail No.1 was built in. (Fig.1)

2. **New detail No.1**
   - The broken (old) detail and the new detail No.1, fitted on the cylinder block the new detail No.2 (Fig.3) body (Fig.2)

3. **New detail No.2**
   - Embedded new detail No.2. On the picture you can see the mounted Metalock joints on one of the surfaces. Next is mounting of packing studs (Fig.4).

4. **Next stage of building in new detail No.3 (Fig.5)**
   - View of the surface after the final processing for achieving flatness and roughness, allowing the proper tightness, (Fig.6)

5. **Stages of the process of embedment of new part No.4 in the casing (Fig.7 and 8)**

6. **Completed Metalock repair and preparation works for mechanical treatment (Fig.9)**
   - After completing the process for embedment of new detail No.4, the surface, being in contact with the face of the cylinder block, was processed to flatness and roughness by means of the bridge plate (Fig.10)

7. **Preparation of the adjoining surfaces for embedment of new part No.5 (Fig.11)**

8. **Built-in new part No.5 (Fig.12)**

9. **Casing condition before beginning of repair works for embedment of new part No.6 (Fig.13)**

10. **Preparation of adjoining surfaces for embedment of new part No.7 (Fig.17)**

11. **Aligned and ready for embedment new part No.7 (Fig.16)**

12. **After completing the embedment of all new parts on casing and cylinder block bodies, the repaired surface was grinded for achieving the necessary flatness and roughness for the next machine processing. All holes were restored for the proper mounting of the engine components (Fig.21)**

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**Repair of diaphragm of under piston space of main engine B&W**

Localization of great number of cracks through colour deflection (Fig.1, 2, 3)

1. **Repair of one of the diaphragm sides (Fig.4)**

2. **Repair of the other side of the diaphragm (Fig.5)**

3. **METALOCK repair on completion (Fig.6)**

4. **Packing of sealing elements along the place where the crack was and grinding for achieving the roughness according to the requirements.**

5. **Final repair works for the already embedded new part No.7 (Fig. 19, 20)**

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**Notes:**
- STBD side of the diesel generator (type “Sulzer” 5AL/30) was damaged in the area of third motion due to failure during operation. (Fig.1)
- The specific of this repair was that wall restoration had to be done without de Chrome SK. That particularly required screening of the repaired section for all devices of the diesel generator. (Fig.2)
- Pattern was taken and it was used for fabrication of casting, which after the obligatory mechanical treatment, had to fit on the damaged area. (Fig.3)
- Aligned and tightened, the new casting is ready for embedment through the Metalock method. (Fig.4)
- Moment of the Metalock repair. The surface that is in contact with the cover is grinded for roughness and flatness, allowing good packing. (Fig.5)
- Completed Metalock repair. (Fig.6)

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**Contact:**
Varna Maritime
www.varnamaritime.com