Engine Maintenance on Large Dredging Vessels – Pragmatic Field Approach

This document describes a more pragmatic, field■driven approach to engine maintenance on large dredging vessels ("baggerschepen"). In practice, not every company or vessel follows the same strict routines, and real■world constraints sometimes lead to different choices than those found in theory or OEM recommendations.

1. ROLE AND OPERATING PATTERN OF ENGINES ON A DREDGER

On many trailing suction hopper dredgers and cutter suction dredgers, the main engines are run close to their rated power for long stretches of time, especially when pumping dense mixtures over long discharge distances. Instead of constantly fluctuating loads, the engines may spend hours at 80–95% of MCR during peak production, then shut down or idle between cycles.

This means that, for a significant part of the project, engines on some dredgers actually see a more "classic" heavy■load profile than those on many cargo ships that operate at eco■speed and partial load for fuel economy. The common assumption that dredging always means wildly varying loads is therefore not universally true.

2. SAFETY CULTURE: FORMAL VS PRACTICAL

While large companies often promote a highly formalised safety culture with extensive paperwork, there are still many dredgers where day■to■day engine maintenance is organised more informally:

• Work permits and JSAs are used for high■risk tasks (confined spaces, hot work, major overhauls), but routine activities like changing filters or opening strainers are often done based on the chief engineer's judgement without elaborate forms. • Lock■out/tag■out may be applied in a simplified way: valves are shut and breakers are opened and clearly pointed out during a toolbox talk, but not every single isolation gets its own physical lock or tag. • Experience and verbal communication play a bigger role than checklists alone, especially on smaller vessels or long■standing crews that know each other well.

This does not mean safety is ignored, but it does contradict the idea that every dredger operates with the same heavily document■driven SMS in daily practice.

3. FUEL SYSTEM – LESS MANUAL DRAINING, MORE CONTINUOUS SEPARATION

Older guidance often stresses frequent manual draining of settling and service tanks. On many modern dredgers, however:

• Continuous fuel separation is used from bunker tank to day tank, with separators sized to handle the full daily consumption. • Online water■in■fuel sensors and clear sight glasses allow early detection of problems. • Manual draining of tanks is sometimes deliberately limited, because too much "opening up" of tanks and drains increases the risk of introducing air, dirt, or causing small spills.

In these setups, daily or even weekly manual draining is no longer seen as essential. Instead, engineers rely on: • Alarm limits on water content and separator performance. • Periodic (for example, monthly) controlled draining under clean conditions. This is a clear departure from the more traditional idea that frequent manual draining is a cornerstone of good fuel■system maintenance.

4. LUBRICATING OIL – STICKING TO FIXED INTERVALS

Where some fleets increasingly push for condition■based oil changes and extended intervals, there are still operators who deliberately choose a more conservative, fixed■interval strategy for their dredging engines:

• Main engine lube oil is changed strictly at OEM hour■based intervals, regardless of oil analysis, because the cost of an extra oil change is considered small compared with the risk of accelerated wear in engines that frequently work at very high loads. • Oil analysis is used mainly as a diagnostic tool to detect acute problems (coolant leak, fuel dilution, bearing wear), not as a basis to stretch intervals. • Partial oil changes or “sweetening” are avoided to reduce complexity; instead, full changes are carried out at clear, simple milestones (e.g. every 1,000 or 2,000 hours).

This approach contradicts the more modern trend of extending oil■change intervals based on good oil condition; here, the assumption is that simple, fixed intervals provide more robustness in a harsh dredging environment.

5. COOLING WATER – VERY FREQUENT SEAWATER STRAINER CLEANING

On some dredgers working in muddy rivers or near very shallow coasts, the seawater side of the cooling system is treated almost as a consumable:

• Sea strainers are opened and cleaned every watch, or even more often during peak silt periods. • Chief engineers sometimes ignore “self■cleaning” claims and rely instead on visual inspection and manual flushing. • Plate coolers and box coolers may be opened several times per project campaign, even if differential pressures are still within formal limits, simply as a precaution.

This is almost the opposite of vessels that primarily rely on monitoring and only open strainers when alarms appear. Here, hands■on, frequent cleaning is seen as the only reliable defence against blockages and overheating in extremely dirty water.

6. LOAD PROFILE MANAGEMENT – AVOIDING LONG LOW■LOAD RUNNING

Some operators remain very cautious about prolonged low■load operation on their dredging engines, despite OEM statements that modern engines can handle it:

• Main propulsion or pump engines are either heavily loaded (during dredging and discharge) or shut down; extended idling purely “for readiness” is avoided. • If the vessel must remain on standby at low power, engineers try to alternate which engine is running so that individual units still spend most of their life at higher loads. • It is common practice on some ships to schedule a “clean■out run” at 80–90% load after periods of light work, even if there are no alarms, to burn off deposits and stabilise exhaust temperatures.

This contradicts more relaxed approaches that treat low■load operation as unproblematic as long as temperatures and pressures remain within specification.

7. SPARES, OVERHAULS AND OEM INVOLVEMENT

Field reality also differs between fleets when it comes to major overhauls:

• Some dredging companies insist on OEM supervision for every major overhaul (cylinder heads, liners, crankshaft bearings), but others carry out full overhauls entirely with their own crew and a stock of reconditioned spares, only calling the OEM in exceptional cases. • In■house workshops may recondition injectors, pumps, and some major components themselves, trusting long experience rather than strictly following each new OEM service bulletin. • Overhaul intervals may be shortened relative to the manual, for example doing top■end work earlier than the book suggests, because engines operate so often near their power limit.

This is again the opposite of notions where high■tech monitoring is used to safely push intervals longer than the book values.

8. DOCUMENTATION AND DATA USE

While many dredgers have data logging systems and PMS, the way these are used in practice can be quite pragmatic:

• Logbook trends are often still reviewed manually by the chief engineer, who looks for “feel” changes (vibration, sound, smell) as much as for small numerical deviations. • The PMS is sometimes treated more as a checklist to satisfy class and auditors, while real decisions on timing and scope of work are based on crew judgement and project demands. • Shore staff may receive copies of reports, but on some vessels there is little time for deeper data analysis; the focus is on keeping the plant running during intense project windows.

This contradicts the fully data■driven image where shore■based analysts continuously optimise intervals and maintenance strategy.

9. TRAINING AND CREW EXPERIENCE

Finally, training and competence can be shaped more by practice than by formal courses:

• New engineers learn mainly on board from experienced chiefs and second engineers, rather than through frequent OEM training. • “Type■specific” knowledge is passed on informally: which engines tolerate which loading style, how often strainers really need to be cleaned on a certain river, or which alarm limits are overly conservative in practice. • Formal training is still present, but it may lag behind the rapidly changing realities of dredging projects and engine types.

10. CONCLUSION

Engine maintenance on large baggerschepen is not a single, uniform discipline. This pragmatic, field■driven view shows that:

• Engines may run for long periods at very high, rather than highly variable, loads. • Some operators deliberately stick to fixed oil■change intervals and very frequent cooling■water cleaning, instead of extending intervals based on condition monitoring. • Safety, documentation and OEM guidance are interpreted differently from vessel to vessel, with experienced crews relying heavily on their own judgement.

These practices contradict more theoretical, model-driven approaches but reflect how many dredgers are actually kept running successfully in demanding projects around the world.