June 2025 Newsletter – Fan Belt Shedding

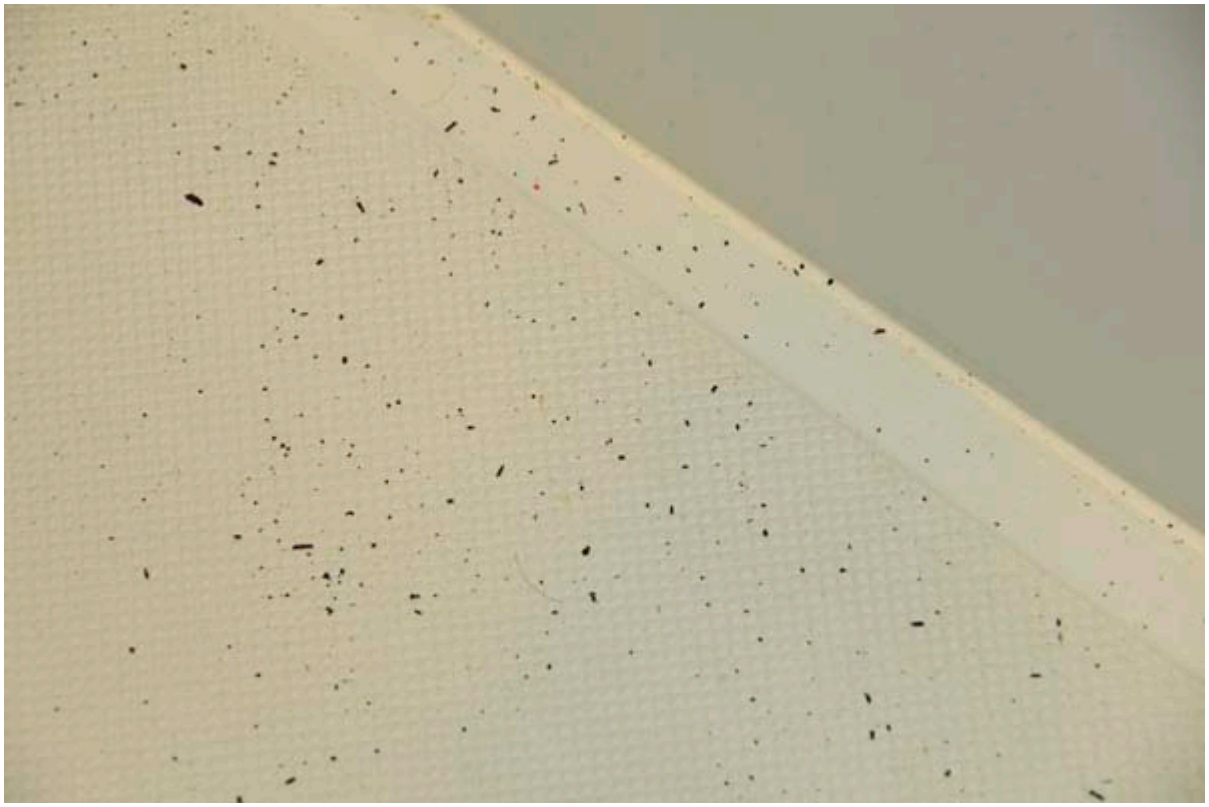


Photo Essay: Fan Belt Shedding

Fan belts fulfill a vital role for engines; they transfer energy from the crankshaft pulley to other vital components and accessories, such as coolant circulation and raw water pumps, as well as alternators. If sized properly for the anticipated loads, and replaced periodically, they are typically reliable. Replacement intervals vary depending on the application and load; belts supporting nothing more than a circulator pump and a small alternator can last for years, while belts used to turn one or two, hard-working high output alternators, especially those that are used with large lithium-ion battery banks, may need to be replaced more often.

If a high output alternator is retrofit to an engine, it’s possible that the existing belt, a single V belt for instance, may not be adequate for the load. Generally, the rule of thumb dictates that single V belts are good for about 1,400 Watts (100 amps at 14 volts, or 50 amps ate 28 volts). Anything more than that calls for dual, or serpentine, belts.

While a misaligned belt and pulley, or belt and tensioner, will often generate very fine, almost oily or greasy in nature, dust, an over-worked V belt will often slip, overheat, sometimes but not always squeal, and glaze. Glazing occurs when the belt overheats and hardens, turning from a rubber-like consistency to a hard plastic, which causes further slippage. At the same time, the pulley surface also glazes, going from a proper satin, to a mirror-like, finish, which also accelerates slippage; this is often a cascading problem.

Over-worked or over-loaded serpentine belts, on the other hand, will frequently generate small particles, what are often described as ‘chips’, of belt material. This can occur when the self-tensioning device oscillates, a phenomenon which is

visible, in an effort to compensate for belt over-loading. This phenomenon can also be caused by inadequate “wrap”, i.e., how much of the belt engages the alternator’s pulley If this engagement is too small, the belt is more likely to slip or chatter.

In the attached images, an engine equipped with twin 200-amp, 24-volt alternators, and a large battery bank, is generating these chips. The problem can sometimes be resolved by switching to a heavy duty “emergency vehicle” belt. One belt manufacturer, Gates Industrial Corp., offers just such a belt, which they call a FleetRunner. In other cases, a new tensioner may be needed. However, before any changes are made, the crankshaft, accessory, idler and tensioner pulleys should all be closely inspected for damage, dents, nicks or other anomalies (even excessive paint), any of which can damage the belt, and create chip-like debris. If your belt is generating dust, or chips, if it squeals, or if it has taken on a glazed appearance, don’t ignore these precursors to an impending belt failure.

More on fan belts here.

Ask Steve

Steve,

Is it necessary to cover battery terminals, if the battery is enclosed in a battery-dedicated box? I have two boxes, one with 4 6v batteries and a second with 2 6v batteries. Both are enclosed.

Thanks.

Bruce Colglazier Pappas, EdD

Bruce:

No, it is not necessary to insulate terminals if the battery is in a dedicated, i.e., does not share the space with anything else, enclosure or box.

More on the subject here.

Hi Steve,

I have read your article in ProBoat about stuffing boxes, I have a comment and a question.

I have a Kadey-Krogen 48 with a JD 6068 engine. My bronze stuffing box uses waxed flax. I have been unable to find a bronze 3/8in fitting for the water injection, so I use brass "hardware store" fittings. I change these every time the boat is lifted (at least every second year) regardless of the fittings condition.

I have several questions:

1. Can you tell me where I can get a bronze 3/8 fitting.
2. The injection water comes from engine cooling water just before it is added to the exhaust. So presumably it is hot. You suggest that stuffing boxes can run 30 to 40 degrees above ambient water temperature, but since my stuffing box uses hot engine cooling water, what temperature should I aim for?
3. Is injected water even necessary since my cruising speed is less than 8 knots.

Thanks for your assistance.

Richard Ross

Richard:

Small plumbing fittings, under ½" NPT, can be difficult to

find in bronze. I've resorted to having them machined from leaded red brass (with a zinc content under 15%) pipe nipples.

A properly running engine should raise the temperature of the raw water no more than 10 degrees F, so this is not an issue. A differential of 40 degrees F remains the goal.

For slow, displacement vessels injection isn't necessary, however, it doesn't hurt, and it does keep the stuffing and shaft log box flushed out. You can make some trial runs without it, while monitoring temperature.

Steve,

I have a 50' Nordhavn with a 2 ¼" shaft. I took the shaft out and replaced the hose with the 5 ply and no wire. I cleaned the stuffing box very well when I installed everything with 3 wraps of 7/16 Flax. I was only left with about an 1/8 of adjustment so I installed a 4th wrap to give me some adjustment.

I don't know what was in it for packing originally, but it was only 3 wraps. Nordhavn told me it could be 3/8 or 7/16 so I went with the larger because what I took out seemed to measure 7/16.

Any advice on this before I launch the boat would be helpful.

Thank you,

Nicholas DeRaimo

Nick:

The stuffing boxes on Nordhavns are usually locally sourced in Asia, so in many cases they don't correspond to industry norms for packing size. Having said that, my stuffing box reference chart indicated that a 2.25" diameter shaft calls for 3/8"

packing material. But again, that’s not definitive.

Regardless, the goal is minimum leakage and coolest possible temperature. Traditionally, conventional stuffing boxes accept three wraps, so four could limit water flow too much. I’d test your set up with a slow to moderate speed run of at least an hour, check the temperature with an IR gun, no part of the stuffing box should exceed about 40 degrees F above seawater temperature. You’ll probably have to make adjustments, and I would continue to monitor temperature and leakage for the next three or four hours. Better too much leakage than too little. If all looks good, try a full throttle run for five minutes or so.

More on stuffing boxes here.