Technical Pull-Out

Q&A FOR YOUR CATALINA THAT'S BEEN FACTORY APPROVED

Catalina 470

C470 Association Technical Editor
Jim Wohlleber
P.O. Box 157
Friendship, MD 20758
(207) 332-3233
Jetjockey6@aol.com
Beckoning, #76

Heat & Scale...Finally, A Happy Tale!

Heat can be both an engineering requirement and, in excess, the bane of the internal combustion engine. Engines are designed to operate at certain internal temperature ranges. This range enhances fuel economy, life of metal components, power output and oil performance. If an engine runs at too low a temperature, the piston rings, cylinder walls, bearings and similar equipment will score and wear out quickly. Too high a temperature "cooks" the steel/cast iron, weakens it, allows for oil blow-by and will quickly trash an engine. Maintaining a proper internal heat range is accomplished in a variety of ways utilizing radiators (in air-cooled engines) and heat exchangers in marine raw-water cooled engines. Several Owners have reported problems with their Fischer-Panda generators overheating and, thankfully, shutting down due to the temperature sensing systems built into the Fischer-Panda (FP) gensets. I experienced this issue aboard *Beckoning* this past summer and twice during the Caribbean 1500 which we did in early November. A solution to this overheating has been elusive up to this point.

Owners have reported changing out impellers even though there was no apparent wear/damage. Minor water pump leaks have been found and fixed, thru hulls checked for stoppage (sometime sea grass or jelly fish have temporarily plugged up the raw water intake) and various other fixes attempted. Some of these fixes have produced short-term results, some have not. One cooling issue not regularly part of trouble-shooting has been the ascertaining of the potential plugging up of the heat exchanger with scale from normal salt-water operations. The heat exchanger itself is difficult to access, requires massive dis-assembly of the outboard side of the generator to remove and replace but is generally not thought of as a problem area for over-heat trouble-shooting. The heat exchanger has tubes running through it with glycol-based anti-freeze circulating through the engine and bringing engine heat to it. Raw water flows through the heat exchanger and carries off the engine heat from the anti-freeze coolant tubes. The size of the exchanger itself and fluid flow rates, both anti-freeze and raw water, are determined by the builder's engineers to maintain engine temperature under normal operating conditions. Reduction of either of these flows will result in the heat exchanger not being able to send engine heat over the side via the raw water discharge flow and the engine will ultimately overheat then shut down.

Scale is composed of salt and minerals in the water which is used for cooling. Fresh water will seldom contain the minerals required to produce scale. Salt water is much different!! The salt and minerals in salt water combined with the normal engine generated heat can combine to quickly produce solid matter which is only too happy to reside inside heat exchangers. As this material builds up it reduces the flow of raw water and thus generates over-heat con-

Catalina MAINSHEET
MAGAZINE SUPPLEMENT

February 2009 • Vol. 28 • No. 1

Publisher/Editor
Jim Holder
830 Willow Lake
Evans, GA
Phone (706) 651-0587
Fax (706) 651-0533
cv.jholder@mainsheet.net

Associate Editor
Carol VandenBerg

Technical Editor
Gerry Douglas
Designer & Engineer
Catalina Yachts
(818) 884-7700
gerard@catalinayachts.com

Catalina Mainsheet is published quarterly by Eagle Ltd., 830 Willow Lake, Evans, GA 30809
Phone (706) 651-0587 & Fax (706) 651-0533 • cv.jholder@mainsheet.net.
For advertising information, contact Jim Holder, Eagle Ltd. For subscription information see page 56.
Technical articles are the opinion of the authors and not necessarily the advice of Catalina Yachts, Catalina Mainsheet or the National Associations.

Direct questions and comments to your class technical editor.

Catalina 470
Jim Wohlleber
Jetjockey@aol.com

Catalina Morgan 440
Lorell Alexander
bonnielass440@aol.com

Catalina 42
Garry Willis
garrywillis@gmail.com

Catalina 400
Brian Mistrot
brian@pbmfirm.com

Catalina 380/387/390
Steve Riddle
scriddle@yahoo.com

Catalina 38
Tom Troncalli
Tdtron@earthlink.net

Catalina 36 MK I Hulls
Steve Frost
sfrost@corpairtech.com
MK II Hulls
Larry Brandt
LCBrandt@coastpilot.com

Catalina 350
Tim Ryan
tjr3c@comcast.net

Catalina 34
Mike Vaccaro
vacntess@mchsi.com

Catalina 320
Karl Mielenhausen
C320@suddenlink.net

Catalina 310
Bill Lewis
wol1@yahoo.com

Catalina 30/309
Max Munger
catalina30@verizon.net

Catalina 28
Garry Hebert
chezbear28@yahoo.com

Catalina 27/270
C27
John Ebell
JEbell2694@msn.com
C270
Phil Agur
pjagur@sbcglobal.net

Catalina 26
Art Harden
artstree@aol.com

Catalina 25/250/Capri 25
C25
Paul Zell
heidenzell@sbcglobal.net
C250
Randy Kolb
kolbrp@hotmail.com
Capri 25
Chris McKillip
sirstopher@yahoo.com

Catalina 18
Erik Van Renselaar
esvanr@firedept.net

Coronado 15
Paul Vance
drpaulvance@comcast.net

ditions and the eventual shut-downs. The fix can be as easy as a reverse flush of the heat exchanger with fresh water, regularly running the genset with fresh water (put the garden hose into the raw water strainer) instead of raw water for cooling or thoroughly and regularly cleaning out the heat exchanger with a chemical de-scaler. I have tried the first two with limited and short-term results. The pictures below show the sequence of events necessary to really clean out the scale build-up inside the heat exchanger with a great product called Rydlyme Marine. Since I have executed this procedure I have run the genset in the very salty water of the British Virgin Islands under continuous maximum load with no overheat conditions.

The heat exchanger is the silvery tube located deep into the sound capsule.

The procedure to thoroughly clean out the heat exchanger on a Fischer-Panda Mini 8 is as follows:

1. Remove the INLET raw water tube; let the raw water drain completely out of the heat exchanger. Using black electrical tape (or a shaved wine bottle cork) plugs the raw-water inlet nipple.
2. Remove the large tube from the forward end of the heat exchanger and elevate it.
3. Using a funnel, slowly fill the heat exchanger via the large tube (Next Photo) with straight (the bottle says to dilute it 50% but severe scaling requires a 100% pure solution) Rydlyme Marine.*
4. Allow the Rydlyme Marine to sit in the heat exchanger for a couple of hours. The first time you do this you will see goo bubbling up from the heat exchanger large tube along with some smoke and fumes. Do not be alarmed! The Rydlyme Marine is doing its job and will not harm rubber lines or other internal parts.
5. Drain all the Rydlyme Marine from the raw water inlet nipple and replace the inlet raw-water tube.
6. Re-attach the large tube (where you had the funnel) to the heat exchanger.
7. Open the genset through-hull for normal cooling operation.
8. Start the genset. I watched the raw water outflow when the genset was first started up. It had lots of nasty stuff in it. The raw water outflow volume will be noticeably greater than before you accomplished the above procedure and your genset will run cooler and be much happier!!!!
9. Check the operating genset for leaks where you had detached/re-attached lines.

Your genset should now be free of scale. Rydlyme Marine can be found in most marine chandleries or by calling the manufacturer. It is non-toxic, biodegradable, non-corrosive, non-hazardous, non-flammable and best of all, it really works!!!!

Rydlyme Marine:
www.rydlymemarine.com
800-451-6291

Raw water inlet tube removed & taped closed

Heat exchanger in normal configuration (Outboard forward corner viewed from above)

*NOTE: The Rydlyme Marine will not fill the heat exchanger completely without poking a hole in the tape covering the raw-water inlet nipple (use a probe or ice pick) or loosening the cork a bit for venting. Make sure you have a container at the ready to collect the Rydlyme Marine venting out of the inlet nipple. Stop the flow of Rydlyme Marine from exiting the nipple when the flow is steady. This indicates that the heat exchanger is filling or is full of Rydlyme Marine. It may take several tries to get the heat exchanger full of Rydlyme Marine.

Heat exchanger tube configured to accept rydlyme marine. Note the large tube attach point just below the rectangular zinc and above the heat exchanger itself.