

Safety @ Sea Seminar

May 18, 2014

FIXING WHAT BREAKS at SEA

(other than people, or your heart)

Jim Antrim, Naval Architect
www.AntrimDesign.com

PREPARATION!

- You've been to all the preparation seminars
- You've gone over every system on the boat
- And *tested* everything to make sure it will work
- Everything is organized and looking rosy.



Why should anything break?

Welcome to reality!

Accidents are a natural part of life.



Assess the problem. Address the problem.

Crisis Scale

BAD

BOAT IS SINKING

That's why we have a liferaft

KEEL FELL OFF

The good news – you probably won't sink

UPSIDE DOWN

Survival plan

RUDDER FELL OFF

Emergency steering options

MAST DOWN

Jury rig

ROUTINE

EVERYTHING ELSE

Things will break. Deal with it and keep going.

Calmly, methodically

Everything below here-
The boat will take care of you

PRETTY BAD

Big problem: taking on water!

Most likely source: seacocks

OSR 4.03 Soft wood plugs

Required at every through hull.

Tapered, appropriate size, adjacent

Keep dry



If it is crack around rudder or keel, reduce sail & heel to reduce load on the area.

Jam whatever you can in the hole

If possible and appropriate, stretch sail across outside hole

Close any watertight compartments

Man pumps & buckets

Gain control of the leak and then consider repair plan

If the hole is too big:



Where is the stuff !?

Grab bag

Big ugly (now beautiful)
orange lifejackets

Water & food

Sat phone, portable radio

You have already planned for:
Who is on the radio
Who gets the grab bag
Last resort: Liferaft deployment

Liferaft time



Big Problem: Keel fell off

How come I
didn't get a
cute chick?





Many boats have lost keels and successfully sailed to shore; but you need to be lucky and fast when it happens.

Challenges are:

Hanging on

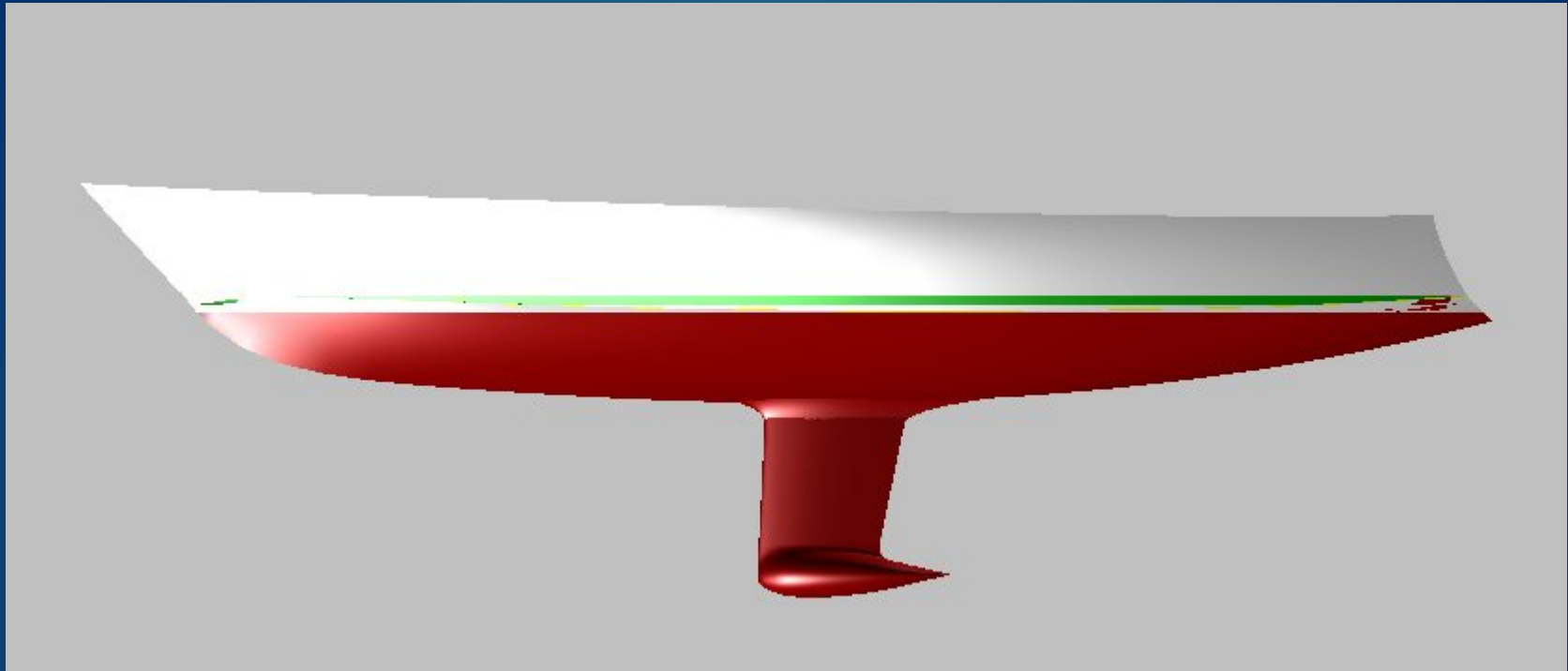
Reaching safety gear

Getting to people who are trapped



Multihulls should have jacklines on underside.
Escape hatch to access interior.

Problem: Loss of rudder



If this was an arrow, the feathers in are the wrong place.

Get the boat under control. Rig your emergency steering

A drogue will steady the boat and make it easier to mount the emergency rudder.

When underway again, balance the sail plan & helm. Drogue may help that too.



Emergency Rudder Links

FREE PDF file drawings of emergency rudder blade

Boats up to 27 ft LOA <http://www.antrimdesign.com/articles/ER27.pdf>

Boats up to 35 ft LOA <http://www.antrimdesign.com/articles/ER35.pdf>

Boats up to 43 ft LOA <http://www.antrimdesign.com/articles/ER43.pdf>

Boats up to 50 ft LOA <http://www.antrimdesign.com/articles/ER50.pdf>

ANTRIM

<http://www.antrimdesign.com/articles/EmergencyRudder.htm>

SCANMAR SOS rudder

<http://www.selfsteer.com/products/sos/index.php>

Paul Kamen's emergency rudder page

<http://www.well.com/~pk/PCrudder.html>

Pineapple Sails

http://www.sailmaker.com/articles/e_rudder/

Blue Moment (Rob Macfarlane)

<http://www.bluemoment.com/emergencyrudders.html>

Lots of Links

http://cruisenews.net/db/pagetemplate.php?cat_id=18

When you lose your rudder

- *“Out of Control”* takes on a new meaning.
- Emergency Rudder tests you did at home *will not prepare you* for this experience! Fin keel boat may spin like a top.
- Deal with problem calmly, crew harnessed to boat.
- Deployment of E.Rudder will be very difficult with boat swinging.
- Drop sails. Raise working jib. Sheet in hard.
- Deploy drogue tied to stern until E.Rudder is fitted.

Steering under EMERGENCY RUDDER

- Forget racing. *Goal is to get to port without breaking the emergency rudder.*
- Reduce steering loads to avoid overloading emergency rudder and tiring the helmsmen
- Moderate speed
 - Steady speed makes steering easier; but avoid high speed surfing, which can overload emergency rudder.
- Balance the sail plan
 - Twin jibs on whisker poles if downwind.
 - Eased mainsheet, or reefed main if excessive weather helm on reaching or upwind course
- Drogue may be useful to make steering easier.
 - Try it if Emergency Rudder is working too hard, steady course is difficult, or sailplan can't be balanced

Emergency Rudder Options

Blade style (looks kind of like a real rudder)

- Custom designed
- Scanmar SOS rudder
- Build it yourself with available guidelines

Steering Oar

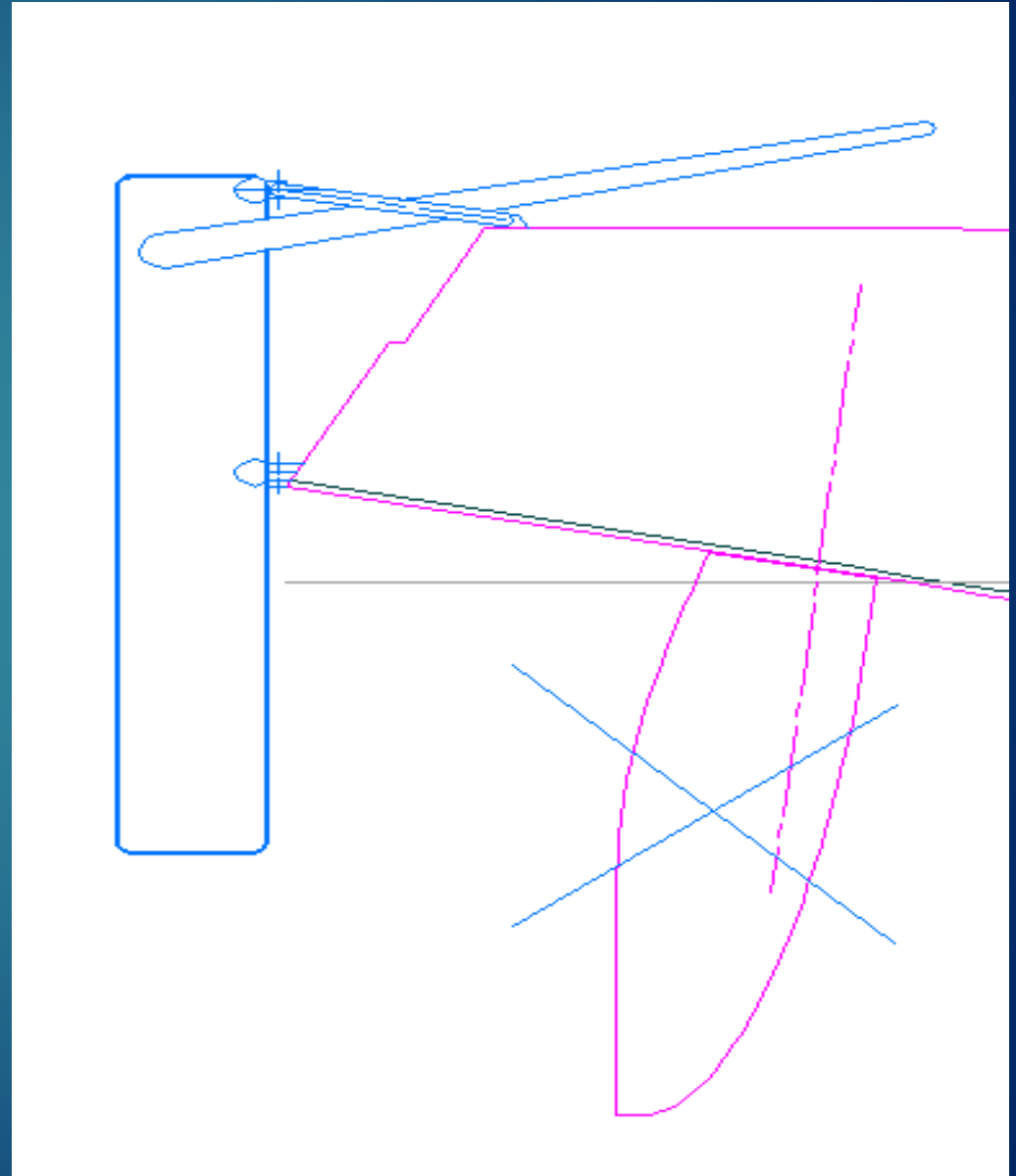
Drag device

- Seabrake or Delta Drogue
- Chain, anchor, and/or annoying crew member hung off spinnaker pole mounted on the transom

Drogue may not be the best primary emergency steering device; but is strongly recommended as an assistance to small blades or oar.

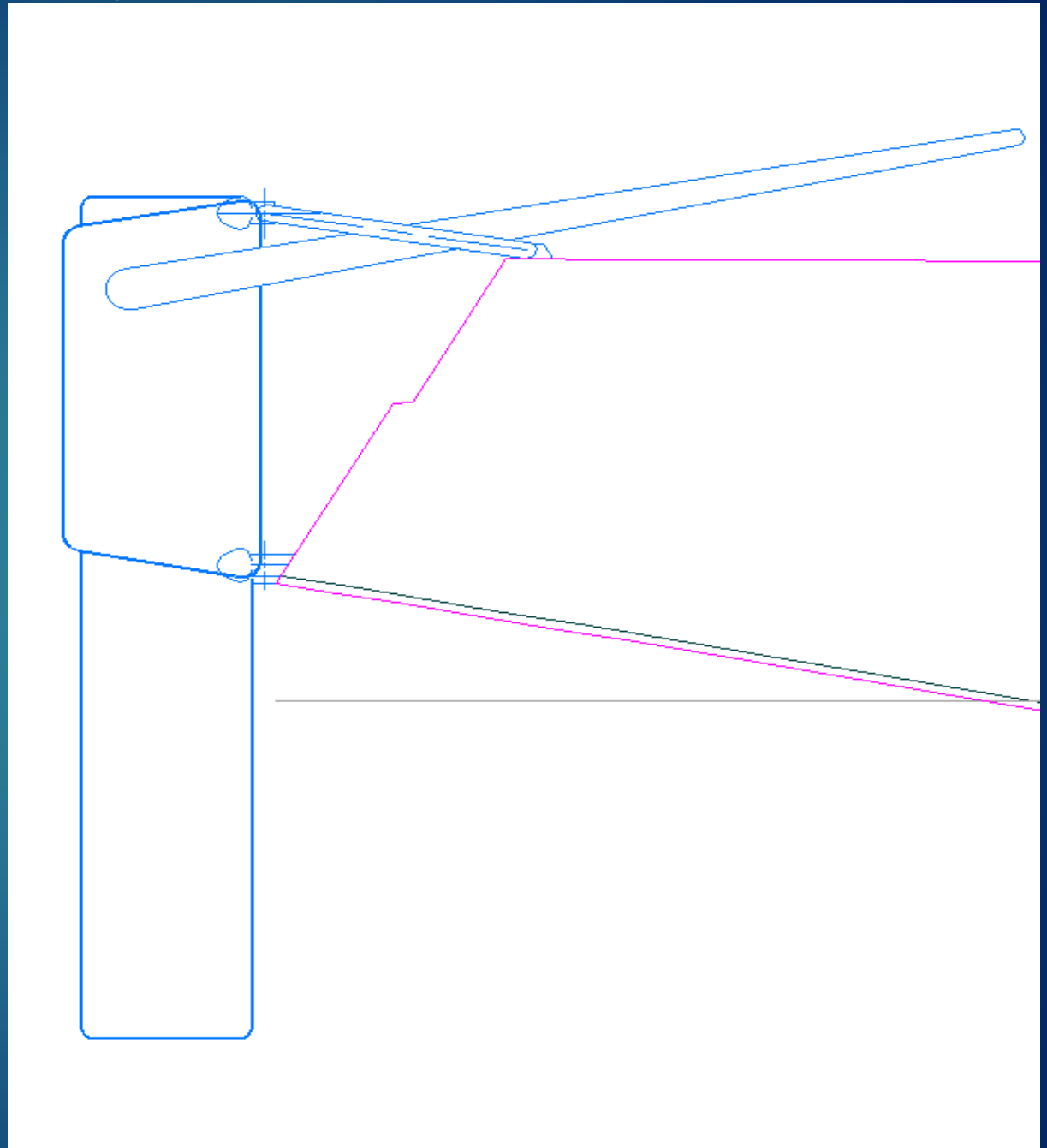
Guidelines for blade style Emergency Rudder

- Draft half of original rudder
- Area half of original rudder
- Thick foil to keep it strong
- Rough surface finish OK
– may help with fat foil



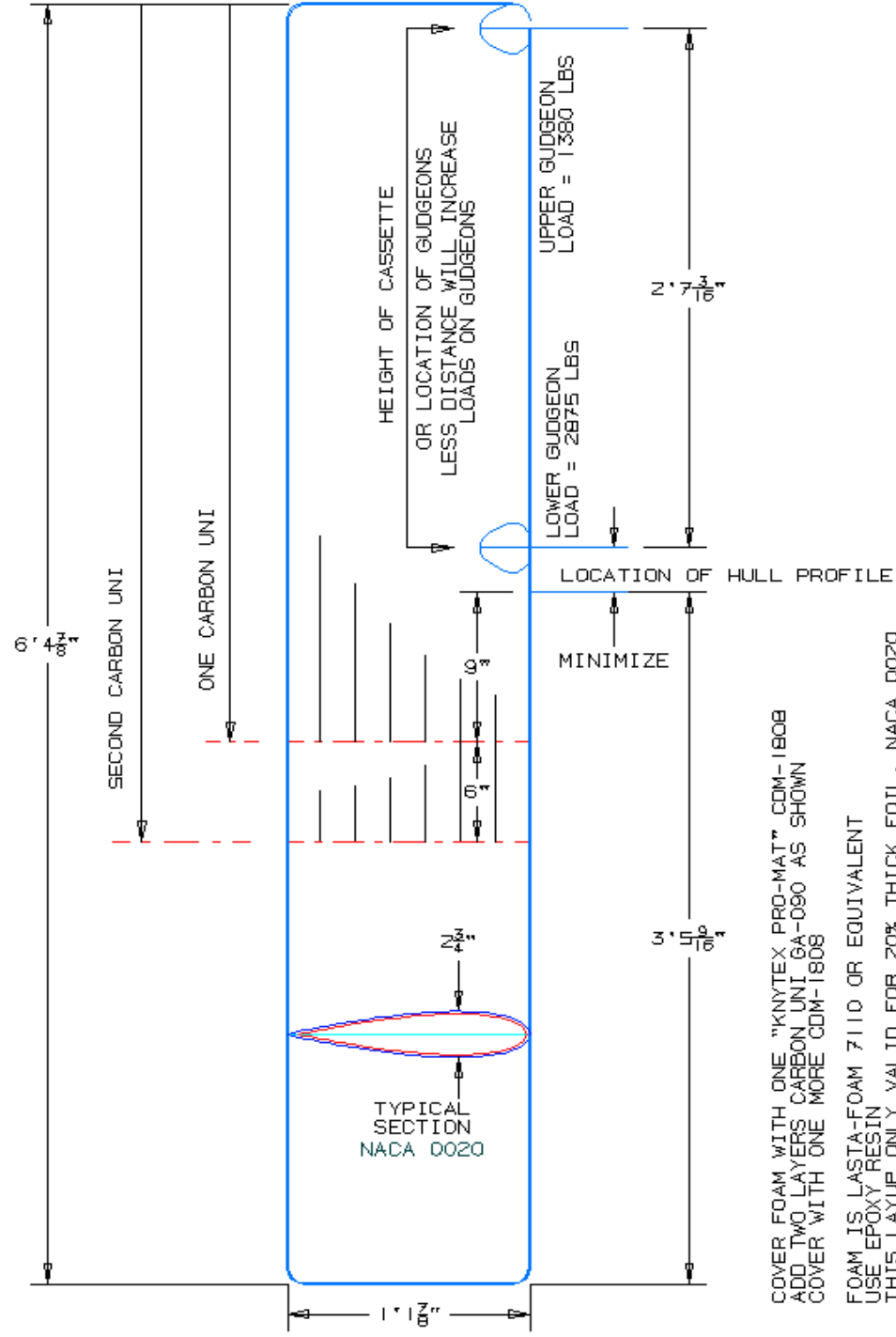
Cassette style easier to deploy

Mount the cassette.
Slide the Blade down



Sample free Antrim blade drawing

FOR SMALLER BOATS, DIMENSIONS CAN BE SCALED BY BOAT LENGTH
DRAFT OF EMERGENCY RUDDER SHOULD BE HALF DRAFT OF PRIMARY RUDDER OR MORE



COVER FOAM WITH ONE "KNYTEX PRO-MAT" CDM-1808
ADD TWO LAYERS CARBON UNI GA-090 AS SHOWN
COVER WITH ONE MORE CDM-1808

FOAM IS LASTA-FOAM 7110 OR EQUIVALENT
USE EPOXY RESIN
THIS LAYUP ONLY VALID FOR 20% THICK FOIL, NACA 0020
ROUGH OUTSIDE SURFACE IS OK
TAPE LEADING AND TRAILING EDGES FOR GOOD BOND

DRAWING
ER-35

TYPICAL EMERGENCY RUDDER BLADE
FOR BOATS UP TO 35' LONG

ANTRIM ASSOCIATES, NAVAL ARCHITECTS
4018 ARCHERY WAY, EL SOBRANTE, CA. 94903 (510) 223-9680
SCALE: (1:1) 1.5" = 1' (1:2) 1.5" = 2'

Scanmar SOS

SCANMAR SOS Rudder™

NEW

**Buy It, Mount It, Store It...
And hope you never have to use it!**

Most modern sailboats have unprotected spade rudders. These designs have dramatically increased the chance of loosing the boat's rudder. If you carry a life raft, shouldn't you also have an emergency rudder system?

The SCANMAR SOS RUDDER is designed for:

A. The racing sailor who has to satisfy the racing rules which protect both lives and boat.
"crews must be aware of alternative methods of steering the yacht in any sea condition in the event of rudder loss. At least one method must have been proven to work on board the yacht. An inspector may require that this method be demonstrated."

ORC safety recommendations for offshore sailing,
paragraph 4.14 Emergency Steering

B. The cruising skipper who has no windvane that can be used as a backup rudder.
"We've all seen articles about how to rig jury steering with floorboards lashed to the end of running booms and such like, but in reality it is very difficult indeed to make these lash-ups work even half efficiently..."

Geoff Pack in his book, *Blue Water Countdown*

- Designed to steer a boat up to 50 ft LOA. Rudder successfully tested in Around Alone for 2000 nm.
- Custom designed mounting system for your boat
- All 316L stainless steel rudder and mounting hardware
- Average weight 35 lbs. (16 kg.)
- All components store easily below deck
- Only four small brackets permanently mounted on boat

LIST PRICE
Standard \$2,295.00
Large Model \$2,495.00

The orange bag for the SOS rudder contains all the mounting tubes, rudder and hardware. Only four mounting brackets are left on the boat.

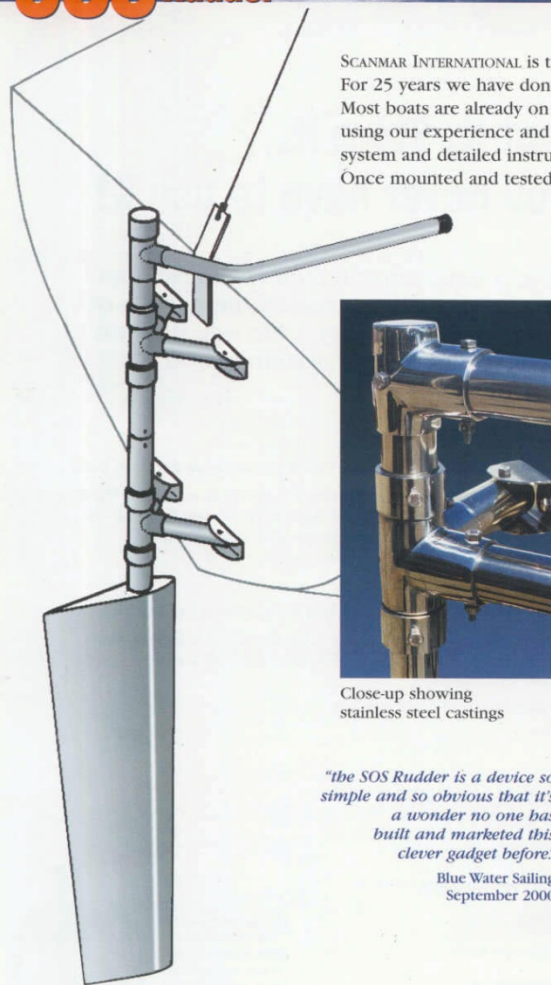
Average space needed for the bag: 48" x 18" x 6"



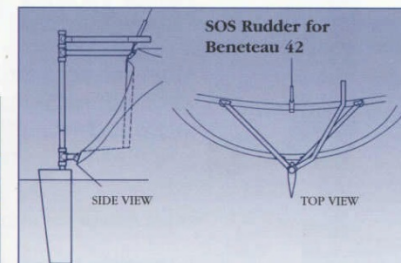
- Good seamanship
- Peace of mind
- Protection of lives and boat

SCANMAR SOS Rudder™

SCANMAR INTERNATIONAL is the world's leading windvane manufacturer. For 25 years we have done installation drawings for our windvanes. Most boats are already on file. When you order a SOS rudder you are using our experience and expertise. The custom made mounting system and detailed instructions will make it easy to install. Once mounted and tested it goes back in the bag.



Close-up showing stainless steel castings



SOS Rudder installation on a Beneteau 42

"the SOS Rudder is a device so simple and so obvious that it's a wonder no one has built and marketed this clever gadget before."

Blue Water Sailing
September 2000

SCANMAR
INTERNATIONAL
FACTORY DIRECT

432 South 1st Street, Point Richmond, CA 94804 USA • Tel: 510 215-2010 • Fax: 510 215-5005 Toll Free: 888-WINDVANE (946-3826)

www.selfsteer.com



auto-helm

Saye's Rig

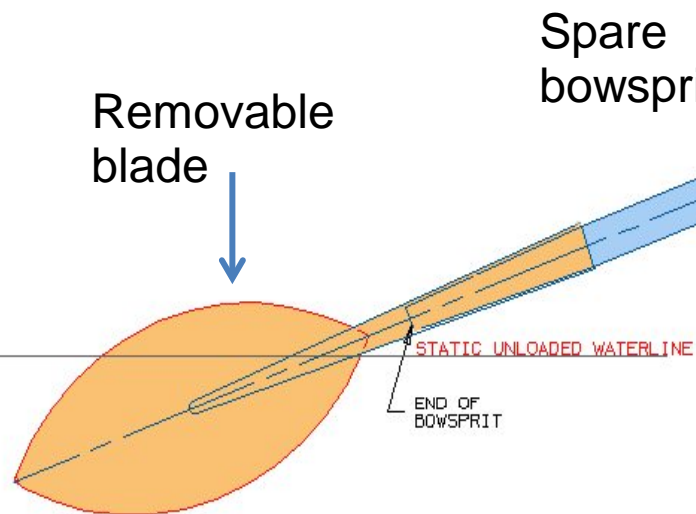
CPT
AUT&PILOT

SOS Rudder

Steering Oar

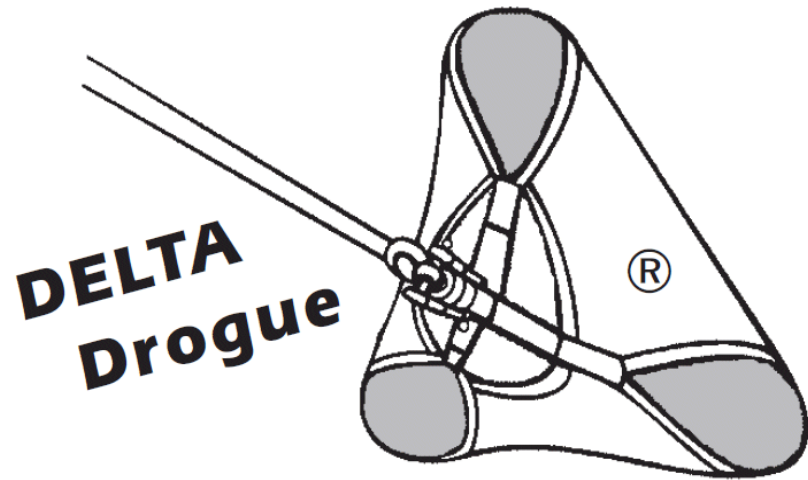
(viable for small, light boats only)

With open transom, pivot point is just a lashing between padeyes on opposite sides of the cockpit. No hard contact.



**Emergency steering Oar
for Antrim 27 "E.T."**

PARA-TECH®
<http://www.seaanchor.com/>



Jordan series drogue

www.seabrake.com/

<http://www.jordanseriesdrogue.com/>
<http://www.seriesdrogue.com/>

<http://www.hathaways.com/galerider/>

<http://www.paraanchor.com/>



Seabrake



Galerider

Steering with a drogue

(Losing the first rudder
wasn't bad enough!)

Wing
& wing

Double
headsail
reaching



David is steering with
a bridle to the drogue.

One side of bridle is
fixed. Boat is steered
by trimming the length
of the other bridle leg.



White
trail of
series
drogue

Big problem: Loss of mast

As with all crises at sea: CALM LEADERSHIP

Steady the boat if possible and necessary.
Consider locking the helm and deploying a drogue.
Sometimes the mast makes a fine drogue.

Save what you can, especially the boom! Ideal for jury rig.
Use winches, block & tackle, to haul broken bits on board. If
there is a risk of puncturing the hull, only then(!) cut it away and
let it sink.

Rig on board and everything in control. Relax, rest, form a plan

Set up a jury rig & keep going!

Common problem



Shrimping 1... An excellent way to break something or hurt someone



Shrimping 2... This is one time you don't want to get to lesson 2

Solution: Turn into the wind and PARK the BOAT.
With no speed the kite can be pulled out of the water.
Also where possible and appropriate, let a corner loose.

A fine jury rig: Moonshine





They cut the carbon mast square with the saw on a Swiss Army knife

BRING A COMPLETE TOOL KIT!



TOOLS, SPARES, REPAIR KITS

– To all you high performance racers:

–Don't get so obsessed with saving weight that you run out of options for repair!

–You will lose much more time struggling with a broken piece of equipment, than you would lose due to the weight of a proper tool.



Loos hydraulic cutters



C-7F CUTTER
P/N 12-01135



C-9 CUTTER
P/N 12-00179



C-12 CUTTER
P/N 12-01174

Felco cutters Meant for wire



Landmann wire cutters

Electrical kit

- At a minimum:
- Stripper/crimper/wire cutter
- Cable ties (useful of lots of non-electrical things too)
- Spare connectors
- Spare wire



Caulking leaks & fiberglass repair



Sail repair kit

- Multiple roles of sail tape
- Spare head/tack/clew rings
- Spare strapping
- Many Sized Needles
- Whipping Twine
- Sail Thread
- Needle Palm
- Utility Blade
- Fids
- Splicing Guide
- Acetone
- Plenty of sticky back spinnaker cloth & other suitable cloth – ask your sailmaker



BANDING TOOLS

Very useful!



Simple is good



Nice, but you can't get the tool out!

Spectra lashing (bring a coil)

4 wraps / tie knot / Spanish windlass on one wrap

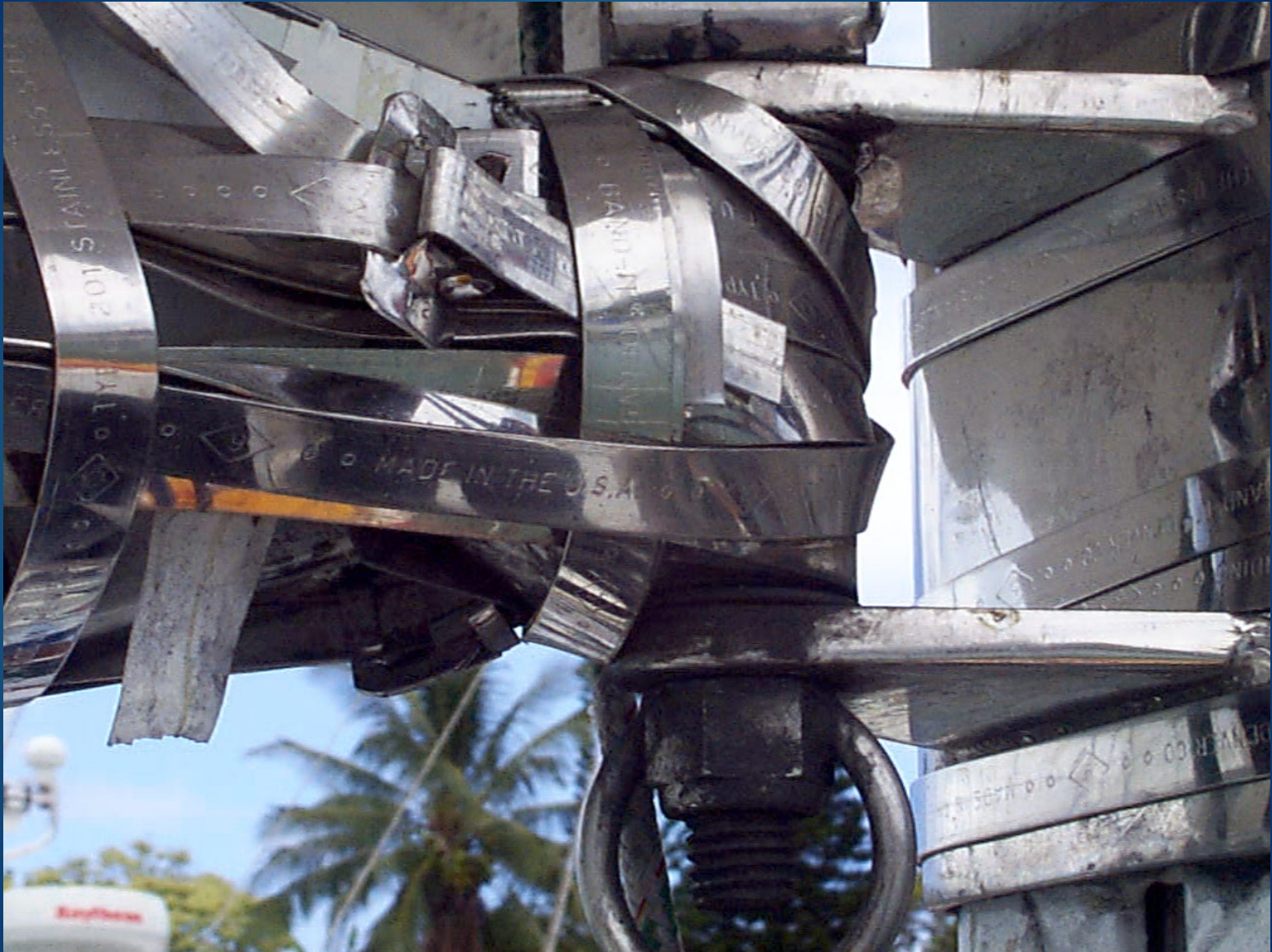
Very tight and effective!



A Banding Tool Masterpiece



Broken Gooseneck!



It doesn't have to be pretty. It just has to work!

Lashing 1.2.3



Note double loop bowline for slippery spectra line

3 wraps then tighten 4th

Bring some strong dowels for the Spanish windlass

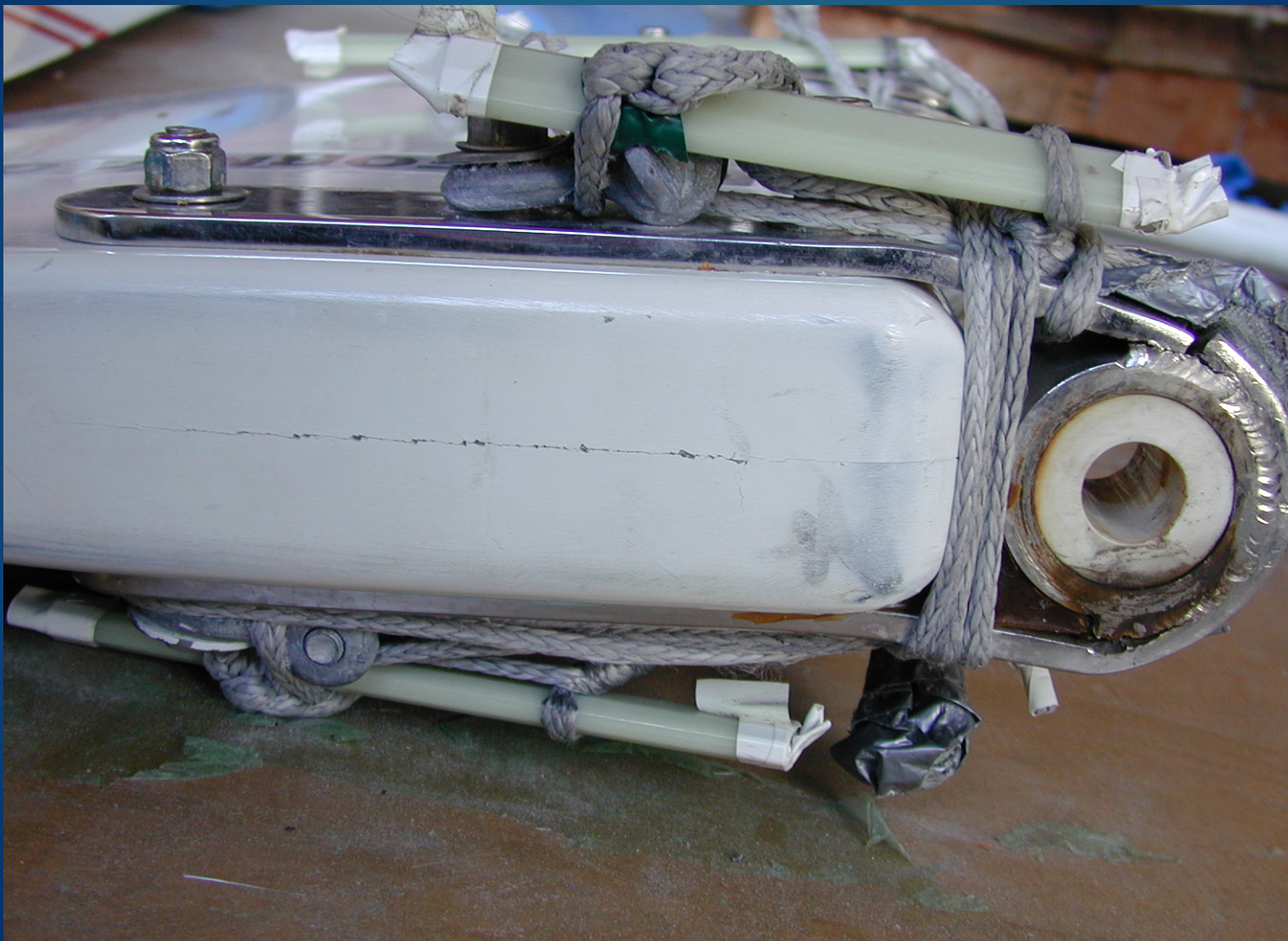
When done, this is bar tight!



Lashing Masterpiece!



Spare batten material made excellent "handle" for Spanish windlass.



A few lengths of ¼" Spectra carried the load that broke 2" x ¼" Stainless Steel.
Note shackles stolen from anchor chain.

Some recommended tools

- Battery powered drill and/or hand drill
- with normal sized bits and hole saw
- Serious bolt cutters capable of cutting your stainless rigging
- Hack saw
- Small versatile saw for wood & fiberglass
- Banding tool *and/or* Spectra lashing system
- Normal mechanics tools: wrenches, screwdrivers, etc.

Final Thoughts



Preparation/ Practice
Ingenuity/Self Reliance
and FUN!

questions, or copy of presentation?

contact@AntrimDesign.com

www.AntrimDesign.com