Inspecting a Barges Towing Rig

Just about every tug boatman sooner or later gets a call from the office go pick up Barge X and tow it to Port B. Since we all work for ISM compliant companies and we follow our Safety Management System religiously we have all the records and certificates for our tug’s towing gear aboard and up to date. But what about the tow gear on the barge we are going to tow? If the barge is one of your companies’ fleet there’s a good chance that there will be records and certs for the gear. The likely hood is that these records will be incomplete or not up to date.

If the barge has been overseas in a remote location for a number of years the towing gear may be worn out, incomplete or totally missing. Whichever the case, you as Master will need to inspect the tow gear or replacement gear as part of your tow plan.

Where do you start? You start at the key “grip” areas. The grip areas are all those points of wear between the parts that make up the tow gear. Examples are: chain link to chain link; chain link to shackle; shackle to fish plate and barge towing pad to shackle. In the picture above you can see the wear in the grip point to the chain link.
Chain for bridles and surge gear

Before rigging up for tow each bridle leg and length of surge gear should be walked and visually inspected for deformation, broken studs, and overall condition. At shipyard docking, a length in each leg over 5 links should be measured 3 times in every 15 fathom length under tension with a proper chain gauge. The inside reach and link length and width should also be checked within the 5 link samples. The diameter of the chain at the grip or crown of the link, for our range of sizes, has a minus tolerance of just 1/8"/3.175mm. The drawings and charts which follow should prove of interest in creating an informed perspective on chain rigging.
Damage to chain

gouges

scratches

arc burn

drag wear

nicks

Danger signs

Wear (▲) points
Stress (●) points

Freeze points of deformed link

Twisted link

Bent link
Towing Shackles

In the field the diameter of the tow shackle pin, the diameter of the shackle bale and the condition of the pin as to straightness plus the fit and status of the threads and nuts are of particular importance.
NOTE:
INFORMATIONAL USE ONLY.
NOT TO BE USED FOR MANUFACTURE.

THREAD NUTS FOR TIGHTER
FIT—FIRST NUT MUST BE SNUG
AGAINST SIDE OF SHACKLE EYE.
TO ASSURE SNUG FIT, TAP NUT
WITH HAMMER BEFORE DRILLING
HOLE. SECOND NUT MUST BE
SNUG AGAINST FIRST NUT. TAP
NUT TO ASSURE SNUG FIT.
THEN DRILL HOLES ON FLAT
OF NUT.

DRILL FOR 3/8" DIA BOLT,
+1/64" FOR CLEARANCE

DRILL & TAP
2-1/2" NC THREAD
BOTH NUTS

1-1/2"
BOTH NUTS

HEAVY HEX FLAT
MILD STEEL JAM NUTS
2 REQ'D

2-1/2" DIA

1-1/8" 1/8

1-1/8" 1/8

2-3/4" DIA

14-3/8"

10-1/8" 1/16

2-3/4" DIA

STD HYD HEX
BOLT HEAD
PER ANSI B18.2.1

R 1.000

NOTES:
STAMP SHACKLE BODY AND PIN
WITH 2-3/4" SF & HEAT CODE, MAGNAFLUX
PER MIL-STD-1949. SHACKLE MATL
4140, PIN MATL 4340. SHACKLE PIN
AND NUTS TO BE PAINTED BLUE.

DESCRIPTION
2-3/4" SPECIAL CHAIN
TOWING SHACKLE

SCHMITT FORGE INC.
PORTLAND OR.
503/222-3641
FAX 503/274-3641

SCALE: .18
DIE NO. PO-39
DRAWN BY: R. LUGAR
DATE: 1/7/93
DRWG. NO.: B1000
A good chipping hammer can be invaluable when inspecting towing gear.
The fish plate and bridle connecting shackles have been hung off clear of the water over the barges' head log. Hanging the gear off like this can greatly reduce the amount of wastage caused by electrolysis and oxidation. Plus you don't have to have all that mud and growth on the submerged chain hauled aboard.
Towing Plates

As a practical matter, the "flounder" or towing plate can be visually inspected for cracks or fissures. Dimensionally it is to be checked at the shackle pockets and for elongation of the bore diameter at the under-rider or haul-in hole in accordance with the drawing. Heavy Duty Marquip towing
plates are issued to our vessels with a stamp indicating the plate has been dye checked, proof-tested and certified.

Wear tolerance for H.D. #2 Flounnder plates is 1 1/4" at the radius of each pocket.
Towing Pad Eyes

The Tow-Pad or Pad-Eye should be checked at the bore for elongation. Visually any evidence of body fissures or cracked welds in the mounting plate should be carefully assessed.
The clearance between the shackle lobes and the tow pad cheek pieces should be 1/4" or 6.5mm.

This clearance should be about 1/4" or 6.5mm.
The bushing positioned in the tow pad bore prior to welding in place
Another view of the bushing positioned in the tow pad bore
The two halves of the bushing installed, aligned with a pilot shaft and ready for welding.
This picture shows a shackle that is properly sized to the towing pad. Note: The snug fit...this helps prevent racking and asymmetrical loading.
Another view showing the close fit of a properly sized shackle
The Emergency Tow Wire should be visually inspected before getting underway. Although it is obviously not a working hawser and receives a thorough inspection on bi-annual dry-docking of the barge (including proof-testing of oil barge rigged wires and re-certification at an approved site), it is important to make sure the Emergency Tow Wire has not been damaged by a cargo loading mishap. The general condition of the sockets, butt-chain, haul-off wire, and float line should also be noted. The towing shackles and pad-eye made up forward should also be inspected according to the stated procedures for the main tow wire.

The description which follows of the Emergency Tow Wire Rig and accompanying sketch reveal the detailed aspects of this assembly. tow-wire but also the condition of the haul-off wire, bill-board, make-up shackles and, in particular, the polypropylene float line. The weaker, smaller components must be up to their design strength and properly secured if they are to function until the Emergency Tow-Wire itself is bent to a towing shackle and re-serviced hawser.

The emergency tow wire is rigged from a stout pad eye welded down on the centerline and well forward on the bow of a Foss barge. The rigging scheme begins with two tested tow shackles: the first is pinned at the pad eye and the second is pinned to the butt chain so that both these shackles are dressed bale to bale. From that second shackle about one quarter of a shot of appropriately sized chain (2 ¾-3 in/70-76mm the main) is led around the side of the barge where the selected emergency or insurance wire is made to the butt chain by dipping a third shackle through the socket. The secured emergency tow wire then runs down the full length of the barge where it comes around and along the after-rake where a fourth tested tow shackle is dipped through the socket at the end of the emergency wire and made up to a 200ft. length of 3/4” wire rope with a thimble eye per each end. This wire is secured, like the emergency tow wire itself, by means of smaller break-away
clips on a steel 'target-board' where this 3/4" haul-off wire is mounted in concentric circles. From a final thimble eye at the center of the billboard assembly a smaller 1-1/2 " galvanized shackle is made up to a 200 ft. length of 5"/127mm circumference spliced yellow polypropylene line which floats as it trails behind the towed barge.
Always check for missing gear
Emergency tow wire painted... what is going on under the paint?