MARCH 2020

THE MISSISSIPPI RIVER

PART 1 – ANCHORING ISSUES AND LOSS PREVENTION ADVICE

INTRODUCTION

Typically peaking between February and May, but also occurring at other times during the year, the Mississippi River experiences high water levels and increased currents due to heavy rainfall and melting snow in the upper Mississippi Valley.

The river height/stage is measured at various gauges, with the closest to New Orleans being known as the 'Carrollton Gauge', located at the U.S. Army Corps of Engineers (USACE) dock on the left descending bank at river mile or mile marker (MM) 102.8 above Head of Passes (AHP).[1]

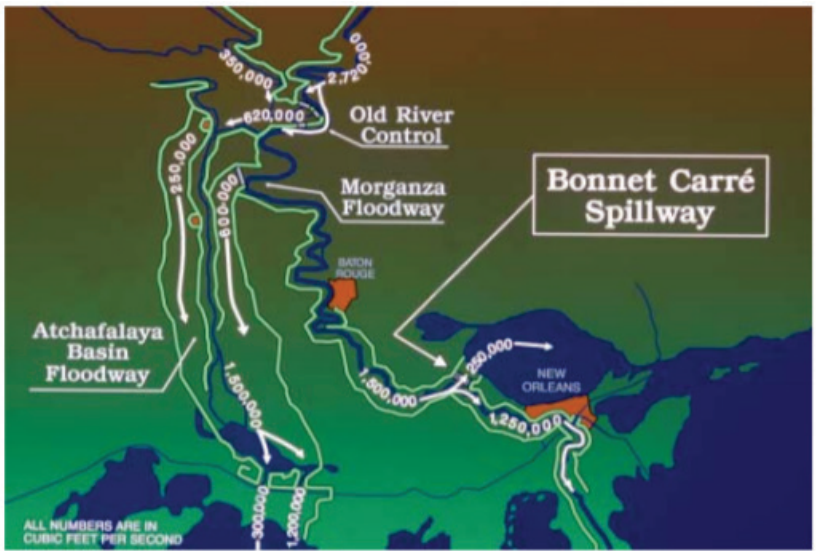
With the city of New Orleans protected by a 20-foot levee, the USACE sets the official flood (or 'action') stage at 17 feet in New Orleans (Carrollton Gauge). This stage is rarely exceeded due to the opening of the Bonnet Carré Spillway at MM 127-129 as a flood control measure to keep the Mississippi River water flow at New Orleans from exceeding 1.25 million cubic feet per second (cfs), which equates to an approximate 17-foot river stage in New Orleans.[2]

[1] Head of Passes is the location of the mouth of the Mississippi River. The Head of Passes is the datum from which statute mileages on the Lower Mississippi River are measured.

[2] The Bonnet Carré Spillway was built in 1931 in the aftermath of the Great Mississippi Flood of 1927. Over the last decade the spillway has seen an increase in operation, with six openings over the past eleven years. Prior to that, the spillway averaged about one opening per decade.

However, a 17-foot river stage corresponds to an observed surface river velocity of 4.9 knots (mean) to 6.3 knots (max), or at sixty-percent-depth a velocity of 4.3 knots (mean) to 5.6 knots (max).[3] Increased river currents result in a higher than average number of vessels experiencing parted moorings, breakaways, parted anchor chains, lost anchors, windlass damage, groundings or collisions.

Such incidents can prove very costly for vessel owners, charterers and their insurers with additional fees for tugs, pilots, crane barges and salvage efforts often amounting to several hundred thousand dollars. Claims resulting in third-party damages and/or terminal tariff fees[4] can often exceed one million dollars.



Floodways and flow distribution during major floods in the lower Mississippi River Valley.

TYPICAL COSTS FOR ANCHOR ISSUES

Tugs: $24,000-$48,000 each/day (often 2 or 3 tugs for several days)

Pilots: $12,000-$25,000/day

Crane barge: $40,000-$70,000/day including mob/demob time

New anchor, chain and fitting: $50,000-$150,000

Bottom survey: $10,000

Future salvage attempt, exposure or claims: $50,000 to uncapped

Terminal tariff for delays: $150,000-200,000/day

PREVENTION AND PREPAREDNESS

The Mississippi River at high river stage can subject a vessel's equipment to large external forces which may exceed maximum design load. Any weak link in a vessel's mooring and anchoring equipment is likely to be exposed to such forces, thereby running the risk of a possible dangerous and costly incident. Risk can be reduced if a vessel is fully prepared for the voyage and its equipment is maintained to its best working condition at all times, but this is

[3] Based on observations from 1973-1989 at the New Orleans and Belle Chasse discharge ranges.

[4] Such fees are typically compulsory and set forth in the terminal berth application signed by the charterer's agent on behalf of the vessel. US courts have upheld such fees as a permitted "liquidated damage" reasonably approximating the terminal's economic losses.

especially the case prior to arrival on the Mississippi River during high water season. The following checklist may be utilized in an effort to reduce such risk:

- ✓ Ensure the vessel's windlass and anchor equipment are in best condition prior to arrival to the Mississippi River. Typical areas of weakness typically include: loose or worn guillotine stoppers and pins; worn anchor links close to maximum allowable diminution by Class; fatigued or worn components of the winch motor and gearing; worn HPU components and sticking pressure relief valves; and, worn brake bands and/or pads, etc. (example photos 1-3 inset below).
- ✓ Check with local agents, US Coast Guard (USCG) and the US National Weather Service for latest information on river conditions, forecasts, and any restrictions in place. Typical high river restrictions include mandatory pilotage and tug requirements for deep draft vessels at anchor, daylight only transits and speed limits, one-way traffic restrictions, daylight only berthing requiring line boat operations, increased spacing, and head-up docking only.
- ✓ When anchoring in ongoing conditions of high water and high current, the anchor and chain may become immersed in the Mississippi River's soft muddy bottom and more difficult to heave, essentially becoming stuck. Also dragging anchors are more likely to snag on riverbed debris. To help prevent this, the vessel should heave and re-anchor every few/several days, according to pilot's advice (this varies at each anchorage and river conditions at the time).
- ✓ Re-anchoring may involve additional cost of pilots and tugs. Again, this should be discussed with the pilot after anchoring and will depend on existing conditions and any local restrictions in place at the time.
- ✓ USCG requires that during high water all deep draft vessels must have three means to hold position, unless moored to a shore side facility or mooring buoys. An example would be two fully operational anchors and the propulsion system. However, should a vessel lose an anchor, or propulsion, then a third means of holding position would be required. In practical terms, this obligates a vessel to engage an assist tug.

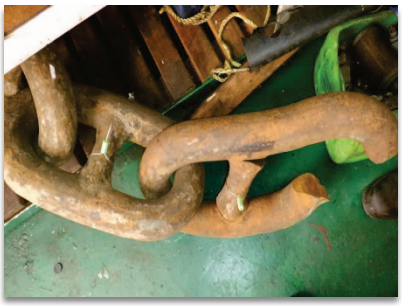


Photo 1: Failed common link to anchor chain resulting in loss of chain and anchor

Photo 2: Ruptured motor housing to windlass experienced during attempted recovery of anchor

Photo 3: Failed stopper pins from the anchor windlass guillotine stopper

MIDSTREAM BUOY MOORINGS – ADDITIONAL CONSIDERATIONS

There are many deep draft midstream buoy terminals on the Lower Mississippi River offering non-stop cargo handling services (loading and unloading to/from hopper barges) via high capacity floating crane barges. Whilst operations at these facilities are not restricted by the USCG during high water (other than the effect of daylight

only berthing/unberthing), the strong river currents make them more risky and parted moorings, lost chains and anchors, and breakaways routinely occur each year. The following recommendations can be considered to reduce risks which may arise at these facilities:

- ✓ In addition to anchoring in the conventional open spread moor with both anchors, the berthing arrangement should aim to stabilize the vessel via a set of anchored mooring buoys; typically, three at the bow and two at the stern (photo 4).
- ✓ Vessels should ensure that enough moorings (including spares) of adequate length (up to 220 meters for some facilities) are readily available for rapid deployment if necessary.
- ✓ It is imperative that the anchors and moorings are constantly monitored and adjusted as necessary. Anchors should take equal amount of strain and moorings should be maintained tight for stabilization.
- ✓ Changes in the vessel's trim, draft, and positioning of floating cranes and barges on both sides of the vessel can all influence the loads acting upon the vessel's hull and must be monitored closely so that necessary adjustments can be made to avoid an incident (photo 5).
- ✓ Should excessive yawing or fishtailing occur then the anchors and moorings can experience repeated high load cycles (fatigue) and/or become overloaded resulting in premature failure (photo 6). Such excessive vessel movements while moored must be acted upon swiftly by a well-trained and instructed crew by adjusting anchors, moorings, trim and barge position. Further actions may require the use of the vessel's main engines, tug assistance, pilotage and possible re-anchoring/mooring. The crew should not hesitate to request assistance from the terminal if necessary.

Photo 4: A typical midstream mooring facility (1)

Photo 5: A typical midstream mooring facility (2)

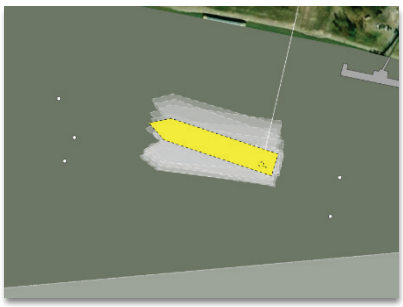


Photo 6: Typical yawing/fishtailing that can occur at a midstream mooring (showing 1 hour past shadow)

RECOMMENDED ACTIONS FOR A FOULED/STUCK ANCHOR

It is a common occurrence during periods of high water and strong river currents for vessels to have trouble heaving anchors. The anchor and/or chain may have sunk in the silty mud bottom of the riverbed, or there may have been weaknesses in the vessel's windlass, motors and/or hydraulics, or a combination of both.

- ✓ In most cases, the anchor and/or chain is likely sunk in the mud bottom, which can cause a suction effect on the anchor when attempting to break free.

- ✓ Occasionally, the anchor may be fouled on other lost or abandoned anchor chains, steel wires, revetment or other debris.

- ✓ Care should be taken to avoid overloading the chain or windlass, which may cause equipment failure or loss of the anchor and chain. This can result in a more costly loss and is especially relevant at a facility where the terminal may claim obstruction and unsafety of the berth requiring expensive salvage attempts while imposing high tariff charges against the vessel for delays.

- ✓ If most of the chain comes up but the anchor remains stuck, the vessel may elect to attempt (with great care) to break the suction which is preventing the anchor from being heaved by keeping the chain directly vertical (up and down), and holding it at the strongest point of the windlass, typically the stopper (photo 7). The vessel should then be maneuvered to apply alternating forces in a forward and aft, port and starboard direction. Tug and pilotage assistance may be required.

- ✓ This effort can be repeated several times (again, with great care) before ordering a crane barge to assist if the anchor remains stuck (photos 8 and 9).

- ✓ If there is the possibility of significant delay or further consequential loss due to a lost or abandoned anchor, then it is advisable to immediately arrange for a crane barge to assist in recovering the anchor. During high water season the local vendors will often be responding to numerous incidents at various locations along the 234-miles of the Lower Mississippi River which can significantly delay response time. Therefore, early and decisive action to arrange assistance can significantly reduce the costs and scope of an incident.

- ✓ In some cases, the anchor can still not be recovered with crane barge assistance after which the anchor chain may need to be released.

Photo 7: Proper securing of the anchor chain with disengagement of the gear reduces the risk of winch or motor damage

Photo 8: Typical crane and/or deck barge assistance

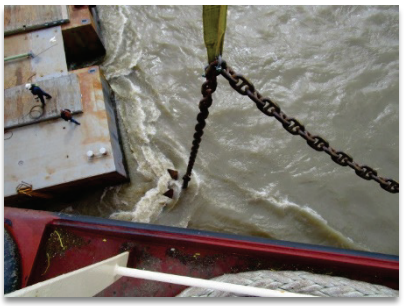


Photo 9: Floating crane barge assistance in recovering an anchor

RECOMMENDED ACTIONS FOR A LOST ANCHOR/CHAIN

Unfortunately, there are many occasions where overloading, cyclic fatigue or premature failure of vessel's equipment results in the separation of the anchor and/or chain from the vessel. Such a situation can be problematic due to the difficulty in recovering the equipment, the costs involved, USCG requirements, and/or potential risk or un-safety that an abandoned/lost anchor or chain can pose to other river users, designated anchorage areas, midstream moorings, berths and terminals.

- ✓ In the event that the anchor and/or chain is lost then the USCG will issue a Captain of the Port Order (COTP) restricting the vessel's movements to the Lower Mississippi River until several requirements are satisfied:
    - A statement from the vessel's Class Society attesting to the replacement of the anchor to their satisfaction OR a letter of dispensation from the vessel's flag administration authorizing the vessel to depart without the anchor.
    - A written salvage plan documenting how the lost anchor will be located and subsequently recovered. USCG must approve the salvage plan which typically takes one to two days.
    - A written statement signed by the Master that the main engines will be ready for immediate use if the vessel intends to re-anchor before the lost anchor is replaced.
    - The serial number of the lost anchor to aid identification if the anchor is subsequently recovered or found (or worse, determined to have fouled another vessel's anchor).
- ✓ Depending on the location of the lost anchor and/or chain, and river conditions at the time, it is likely that safe or successful salvage by means of grapple dredging will not be possible (photo 10).
- ✓ Local salvage companies, acting in cooperation with local agents, will often demand between $40,000 and $70,000 USD/day (varying on mobilization time and distance) for the provision of a salvage plan and commitment that they will return with a crane barge to the suspected site of the anchor/chain at a later date (typical in the Spring or Summer time following cessation of the high water season).
- ✓ However, this commitment is not always necessary and the odds of successful recovery many months later is very small (especially for anchors only).
- ✓ Alternatively, IMC have submitted anchor salvage plans on behalf of vessel owners that have been accepted by the USCG as satisfying the COTP provisions.
- ✓ Replacement of anchors does not always need to be completed by expensive floating crane barges. Rather, replacement anchors can often be transported to the vessel on the back of a crew boat, or small supply boat, or delivered dockside, and reconnected by the vessel's crew (photo 11).
- ✓ In situations where anchors are lost at a berth, or at a midstream buoy terminal, then it is also possible to have a bottom hydrographic survey conducted to help locate the anchor and/or demonstrate that the lost anchor/chain does not pose a danger to navigation (photo 12). The typical cost for such a survey is $10,000 USD.
- ✓ In situations where tugboat and or pilotage assistance is required by the USCG, then the cost of each tug and/or pilot will be around $25,000 USD per unit/per day. It is not uncommon for vessels having anchor issues during high water to incur additional port fees of around $500,000 for tug and pilotage services. It is also not uncommon for terminals to claim $150-200,000 USD per day (for upwards of 30 days) for any delays caused at their berths or midstream buoy facilities as a result of such an incident.

- ✓ Due to the quick escalation of costs, IMC often recommends our clients take the approach of 'prudent overreaction'; i.e., choosing to mobilize assist tugs and a crane barge sooner rather than later. However, each circumstance is different, and the best course of action depends on several factors including the specific anchorage or berth, existing river conditions, and/or other restrictions in places, including commercial considerations.

Photo 10: Typical grapple hook for attempted lost anchor recovery

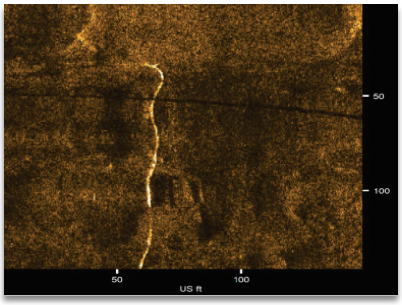


Photo 11: Multibeam bathymetry system and/or sidescan sonar surveys can help to locate lost anchors and chains

Photo 12: Fitting a new anchor and chain with mobile shore crane assistance

CONCLUSION

With high river conditions come significant delays and backlog to commercial operations. A 3-4 day expected port call can become weeks longer. The prolonged duration of being anchored, moored, or in transit on the Mississippi River exposes vessels and their equipment to greater stresses and increased exposure.

Preparedness and knowledge are key, although when incidents do occur IMC's experienced team of correspondents, experts and surveyors are ready to assist.

Additionally, through our long-established network of local salvage, repair contractors, surveyors, regulatory and legal contacts, we can advise and oversee any such situation, resulting in more favorable outcomes for our clients.

For further information about the IMC team, capabilities and resources, please review our website at *www.independentmaritime.com.*

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