

Boat Crew Operation of Thames River Locks

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During April 2006 the author of this report had the opportunity to cruise approximately 100 miles of the River Thames in England in each direction. This was done in a small “self-drive” hire (rental) cruiser, crewed by the author and his wife. This paper summarizes his observations and experiences regarding operation of Thames River locks by boat crews.



Goring Lock, River Thames – Photo shows user operated control station with both manual and computer sequenced operations.

The River Thames

England's River Thames consists of three major segments: an ocean estuary, a tidal river, and an improved navigation.

The improved, non-tidal section is about 125 miles in length. It begins at the town of Lechlade and ends at Richmond, on the western edge of London. This navigation, managed today by The Environmental Authority, includes 44 locks.

Boats of up to 108 feet in length and 14 foot beam may travel the entire length of the river, although vessels are limited to an overhead clearance of 7 feet 6 inches upstream from Oxford. Below Windsor, vessel up to 175 by 19 feet may be accommodated.

Generally speaking, the locks were located at the sites of mill weirs, and were not chosen for their contribution to efficient navigation. Only a very few sites still have mill streams, and those are “historic preservation” features. It has been essential to maintain old locations, despite the large number of locks and small lifts, in order to preserve historic features, both natural and man-made, along the river banks.

At all of the locations visited, the lock is on a channel separated from weir stream, or streams, by islands. Locks are similar in general plan. They have miter gates at each end. Water flow to fill or empty the lock is through sliding vertical paddle sluices, with one located in each gate.

The 11 locks upstream from Oxford are entirely manually powered.

The 33 locks downstream from Oxford use hydraulic cylinders to move sluices and gates.

Today most traffic on the river can be classified as recreational and passenger vessels, with most freight traffic being related to construction along the river.

During the summer, passenger vessel traffic includes short trips at numerous locations such as Richmond, Oxford, Reading, and Henley. In addition, daily point-to-point service is offered between several towns. Several “hotel boats” offer overnight cruises as well.

Recreational vessels range from canoes through residential cruisers converted from European canal barges over 100 feet in length. Competitive rowing facilities are found throughout the length of the river. Some of the private cruisers are fully fitted for ocean work and actually make regular weekend or longer trips to France and Holland.

From the lock management standpoint, the “hire cruiser” (rental) industry is particularly important. In 1980 there were over 1,000 “self-drive” cruising boats in rental service on the Thames. Today this has fallen to about 125 vessels, but these average about 20 trips per year. Thus there are still about 2,000 vacation cruises a year on the river. The holiday cruise parties come from all over the world, and are a multi-million dollar contribution to the local economy. Many crews have no prior boat operating experience, and may have limited English language fluency. On summer weekdays, hire cruisers are likely to constitute the majority of lock traffic.

Lock Operation

All locks are staffed with professional keepers. Each Keeper’s duties include minor lock maintenance and major decorative gardening in addition to lock operation. During the hours of 9:00 a.m. to 1:00 p.m. and 2:00 to 5:30 p.m. Keepers are generally expected to be available to operate locks, but are permitted absences from the site when necessary.

During daylight hours when Keepers are absent, boat crews are permitted to operate any of the locks. During summer, the number of hours during which users may operate locks exceeds the staffed time.

There are no training requirements or other qualifications for operators. Knowing that we had extensive canal lock operating experience, our boat yard gave us no instructions on locks, although some may provide instruction to novices. No key or tool is required to operate locks. The guidebook which we purchased included only one column of advice and this was primarily concerned with procedures to be followed when locks are manned.

All locks have “lay-by moorings” where crews may land to conduct lock operations or to moor while waiting for admission by the Lock Keeper.

On the eleven manually powered locks sluices are operated with geared hand wheels. When operated by one person, the near gate is moved with a long balance beam and the off-side is moved using a long “boat-hook” type pole. No major instructions are provided, although notices relating to local conditions may be posted. The largest of these completely manual locks is 114 feet long, 15 feet wide, and has a lift of 7.3 feet.

All of the thirty-three hydraulically powered locks have both electric and manual pumps. Until very recently the electrical pumps were used only by Keepers. Boat crews choosing to operate these locks in the Keeper’s absence had to provide power by manually hand cranking a wheel. Because of the high friction in the system this involved both considerable force and many turns.

Within the past three years the Environmental Authority has begun the installation of computer controlled electro-hydraulics for boat crew use. These systems are currently in use at at least six locks.



Boat crew's operating panel at Goring Lock

There are several detail variations in control layout, but each has a pushbutton control panel. Users select between opening or closing gates and opening or closing sluices. For safety purposes, gate operation controls are “push and hold.” Sluice operations are through a timed sequence which steps valves open over a four and one half minute period. Interlocks prevent simultaneous operation of upper and lower end controls.

The largest lock which we observed as currently having user electrically operated powered hydraulics is 174 feet long, 22 feet wide, and has a lift of 8.8 feet.

Potential Security Issues

While there are conspicuous “authorized persons only” notices posted at locks, at no point did we encounter security fencing of any sort, except around active construction sites.

In many locations there is a public footpath over one or both of the lock gates. Many of the locks are in either rural or industrial areas which might be considered “low security.”

There is the potential for significant damage from improper operation of locks since flood levels in some pools are only about a foot above normal levels. In addition to lock sluices, the public has physical access to manually positioned paddle sluices in many weirs; although power operated sluices are locked between operations.

Summary and Conclusions

England's Environmental Authority has begun adding modern control systems to Thames River locks in order to improve customer service during hours when locks can not be staffed. This is a change in technology, not policy, since it continues practices which have been in effect for perhaps a century.

Boat crews appreciate the easier operation of the new systems, and off-hours operations will certainly increase. In addition, user operation will allow more staff flexibility in duty hours, and potentially reduce staffing requirements.

The scale of locks on most American Rivers is considerably larger than those used on the Thames, but a similar approach might be employed. The operational technology might be directly transferable.

The lack of small boat landings above and below locks constructed by our US Army Corps of Engineers means that some rearrangement of site plans and modest construction would also be required in order to adopt user operation. The addition of such Access points would, however, facilitate the construction of portage routes for canoes and other very small vessels.