WINDING HOLES - towards a specification for the ideal turning place

Introduction

The term 'winding hole' is normal in the 'narrow' canal network, and on adjoining broad canals, for a space in which to turn a boat. Nearer the coast and on navigable rivers, nautical terms such as 'swinging area', 'turning space' or just 'wide', are found. On rivers, turning space varies a great deal, often boats can turn anywhere along the main course of the channel, or at the confluence of tributaries, etc. A designated turning space to one side of a canal or navigable channel should provide for the longest and widest boat likely to be navigating the particular section of waterway. Because some of these features (together with junctions to arms etc) have been lost or restricted over the years, the following notes describe the basic minimum requirements when considering future provision.

River navigations vary a great deal – and the shape or naming of turning spaces will not be the same as on artificial canals; however, where a river navigation authority deems a 'turning space' to be an excavated or dredged facility, the minimum requirements of shape would appear to be very similar to that described for canals, although it is admitted that some boatyards might have only sought provision for a limited range (e.g. for boats in their fleet).

Canals: The usual requirement on a canal is a vee-shaped indent in one bank to provide the required width of channel, equal to or preferably slightly greater than the length of the longest boat. The 'vee' should offer a total angle of at least 90 degrees, in order to allow ease of approach and exit. In order to avoid getting the bow wedged in the corner of the vee, a radiused corner would be preferred, and this radius should be at least as large as the beam of the boats which would use it. This offers a smooth curve on which to touch the bow if required, when turning in stages. The corners of the vee shape with the main channel should also be curved, to avoid too much damage to craft accidentally touching them.

On the **'narrow' canal** system the principal dimension that should be observed is the minimum 'width' at the turning space, measured perpendicular to the line of the channel, of 72 feet (22m) plus a margin of clearance.

On the **broad canals**, the basic requirements are similar, bearing in mind that the width of the channel may already be wider on these canals, but in some cases can carry longer (or shorter, in some canals) boats. A larger radius at the point of the vee would also be a good idea, together with slightly higher bank or piling, to reflect the larger boats likely to be found.

Opposite side curve: In cases where a limited land area is available for a winding hole on the 'off-side', a curved indent in the 'towpath-side' is sometimes found, which complements the perpendicular indent of the 'vee' end of the winding hole itself.

Depth: Winding holes are usually provided on the 'off' side of a canal – i.e. the other side from the towing path. This is because as boats are usually steered from or near to the stern, the boat can be manually turned easily if required by steering towards the vee – and crew or steerer stepping off onto the path if necessary to pull the boat round (this also saves energy and time). To ensure any boat's ease of manoeuvrability and safety of crew, the entire 'vee' area should be constructed and *dredged* to the full depth of the canal, because sometimes it will be found easier to put the stern into the vee – e.g. to allow the wind or current (where there's a flow) to move the bow round to complete the turn.

Frequency of provision: Traditionally, winding holes would have been provided either side of any wharf, yard or terminus facility for the trading boats in use, unless such a facility was a large enough basin for unrestricted use. Today winding hole use is not perhaps exploited so much by the privately owned boats as by hired boats, where time restraints calls for a turn-round on a single route half-way to get the boat back to base without incurring late penalties; or even perhaps after mistakes in navigation. Also, passenger carrying boats and day-boats require a variety of lengths of cruise to suit limited available route-time, for example a 'there and back' cruise of two hours would require a suitable turning point after one hour from base. The few trading boats on our present canals, offering fuel or other provisions on restricted lengths, as well as maintenance boats, can also benefit from a selection of possible turning places – and these too are likely to be of a 'full-size' type of craft.

Marina entrances: In many cases, a marina entrance, wharf space, old arm of a canal (sometimes marked by a bridge for the towpath crossing), etc, can offer space for turning. In some cases however, especially where moored craft suggest that extreme care is needed, signs or chains have been erected to prevent or at least dissuade use for turning. Whilst this is regrettable, it also emphasises the need for adequate turning provision elsewhere.

Signage: whilst remote winding holes are often left unsigned, where any congestion is likely it is important that 'no mooring' is allowed opposite such a facility, so suitable signs should generally be in use.

Conclusions

The maintenance of winding holes both in number and in condition is important for users. Any loss of a former winding hole is therefore to be regretted, and hopefully a subject for restoration. The possibility of introducing new sites to turn the boats described above would widen the choices for commercial applications – e.g. hire and trip types, to encourage expansion of these trades, as well as providing more choice for private owners and any carrying and maintenance craft operating. Opportunities such as marina entrances and tributary or junction design and retention, and provision of bank protection methods, should be encouraged to provide and maintain the necessary frequency and quality of winding holes.

Some illustrations follow, after which an appendix includes drawings and greater detail on the above theme.

Existing examples:

Winding hole with generously wide vee angle

(Langley Green, BCN)

Friendly marina entrance

(Droitwich Marina, Worcs.)

Unfriendly winding hole – concrete, sharp corners

(Llangollen Canal)

Note damage to edge – imagine damage to boats!

Appendix – Drawings

General

It would appear that the ideal minimum plan shape for convenient turning of the largest craft on a given waterway would be as follows:

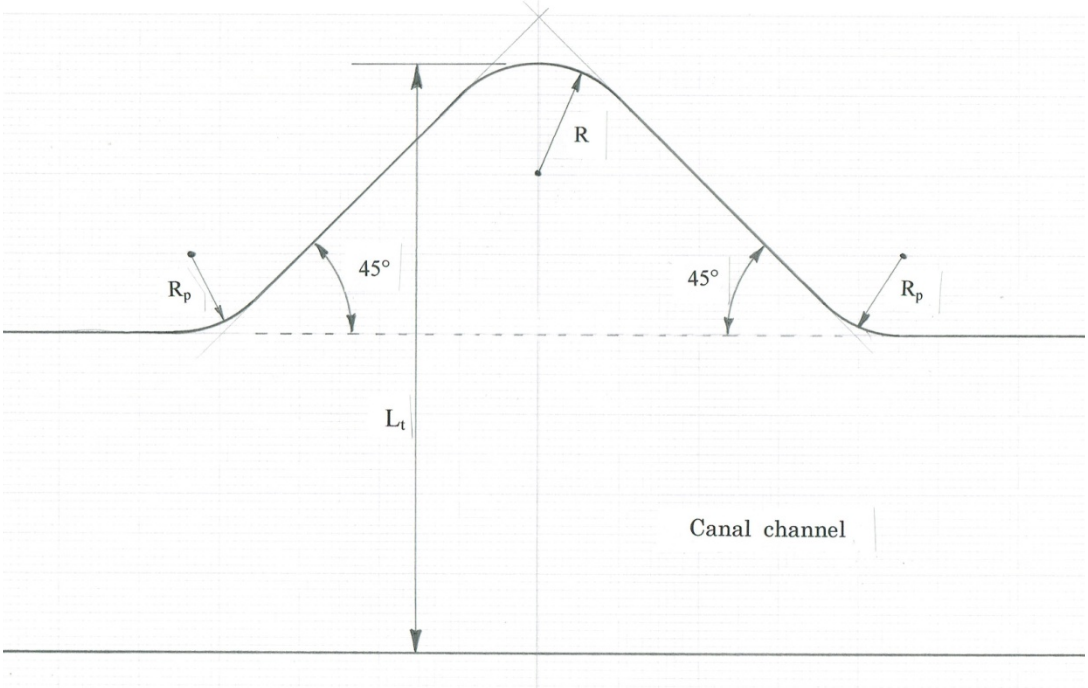

Fig. 1. *Where:* L_t = *max. boat length for canal, plus a margin of clearance.*
R = radius equal to at least max. beam.
R_p = *preferred radius at corners, i.e. at least similar to R.*

Narrow Canal Provision

The extensive 'narrow' canal system dates from the late 18th century, on which the largest boats are about 72 feet by 7 feet beam (say 22m x 2.2m). (Although some longer boats were used in restricted lengths of the Wolverhampton level of the BCN, they could not pass through locks, and none survive in use). Therefore, the minimum perpendicular dimension should be 22m – or preferably a metre or so longer than this to allow some clearance, and therefore reduction in water turbulence. The radii, both at the point of the vee and the corners could quite usefully be equal to or greater than the beam or 2.2m min.

Broad Canal Provision

The basic requirement is usually the same, but the radius at the vee should be twice the size of that above, in order that wider boats can turn without experiencing a ‘tight-spot’ on their bows.

It is worth mentioning that on broad canals such as the G.U. main line and S.U. broad section, the nominal width of channel is greater than on narrow canals – but the maximum boat length is similar. Some canals (e.g. the Huddersfield Broad Canal) have a shorter ‘L’ dimension. In these cases the amount of land required for the ‘vee’ will be less than that required on the equivalent ‘narrow’ canal – BUT where larger locks are encountered, larger boats will be found, and each waterway section should be considered individually.

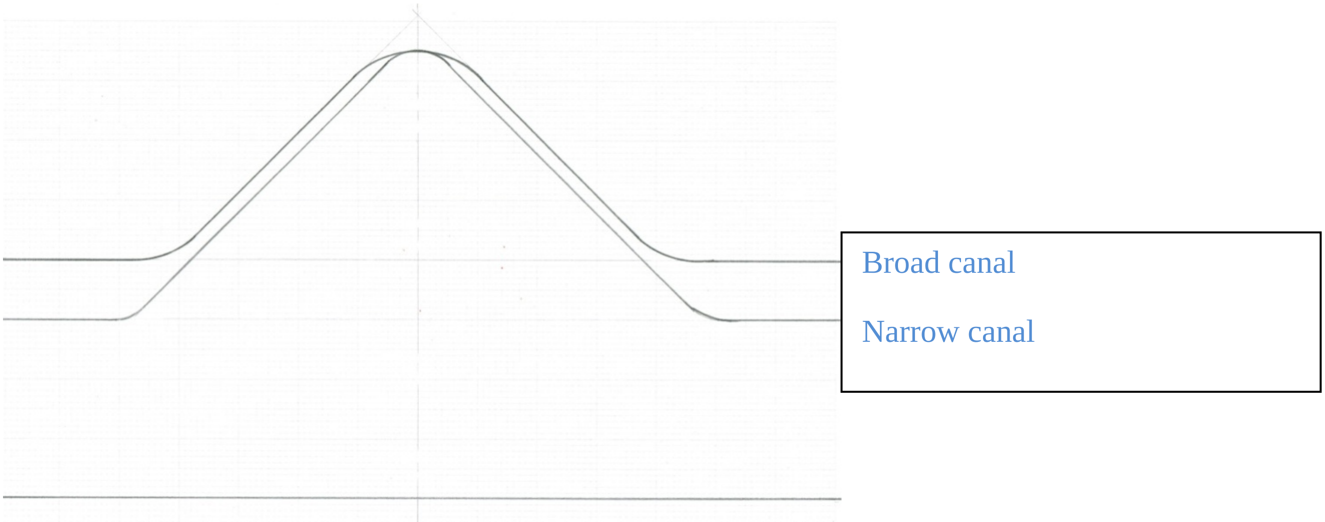

Fig. 2. Showing comparative land area used on broad and narrow canals (assuming respective nominal widths of channel).

Turning Spaces on Rivers

As mentioned earlier, rivers vary a great deal – and the shape and terms used for turning spaces will be individual; however, the *minimum* requirements of shape are very similar to that described above. Most probably, it will be on the ‘off’ side to any river-side path, will have no foot-access to the bank, and will provide for the maximum size of boat expected on that navigation – and will require similar depths to the main channel.

Provision of Extra Space opposite the Winding Hole

In cases where a limited land area is available for a winding hole on the 'off-side', a curved indent in the 'towpath-side' is sometimes made, which complements the perpendicular indent of the 'vee'. The radius of the tow-path curve should be taken from the radius in the vee, which should of course total L_t, as before, to allow for the turning boat.

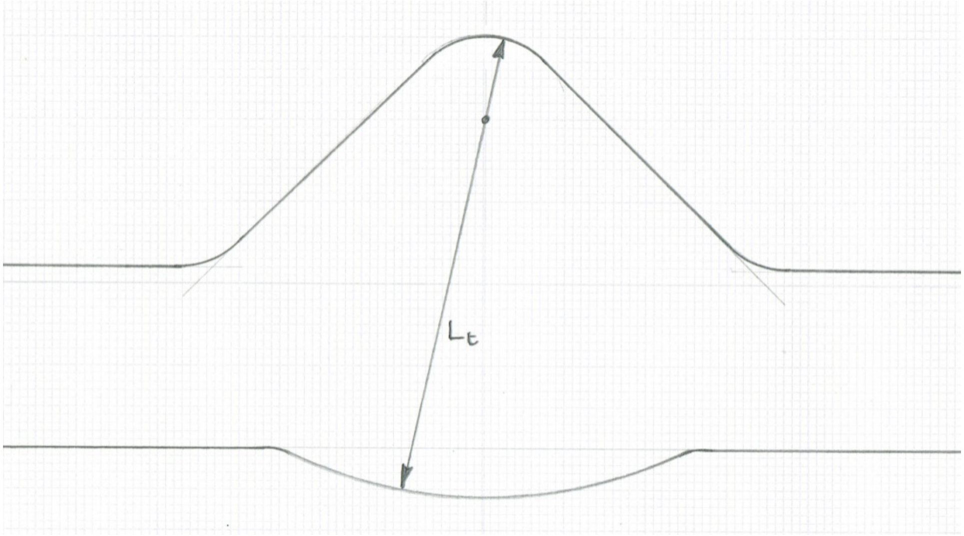

Fig. 3. Showing complementary curve in opposite bank, if required.

Truncated 'vee' v 'radius'

It can be seen that using the angular shape of a 'truncated vee' uses more land area than if the vee is radiussed, as the perpendicular dimension would remain the same.

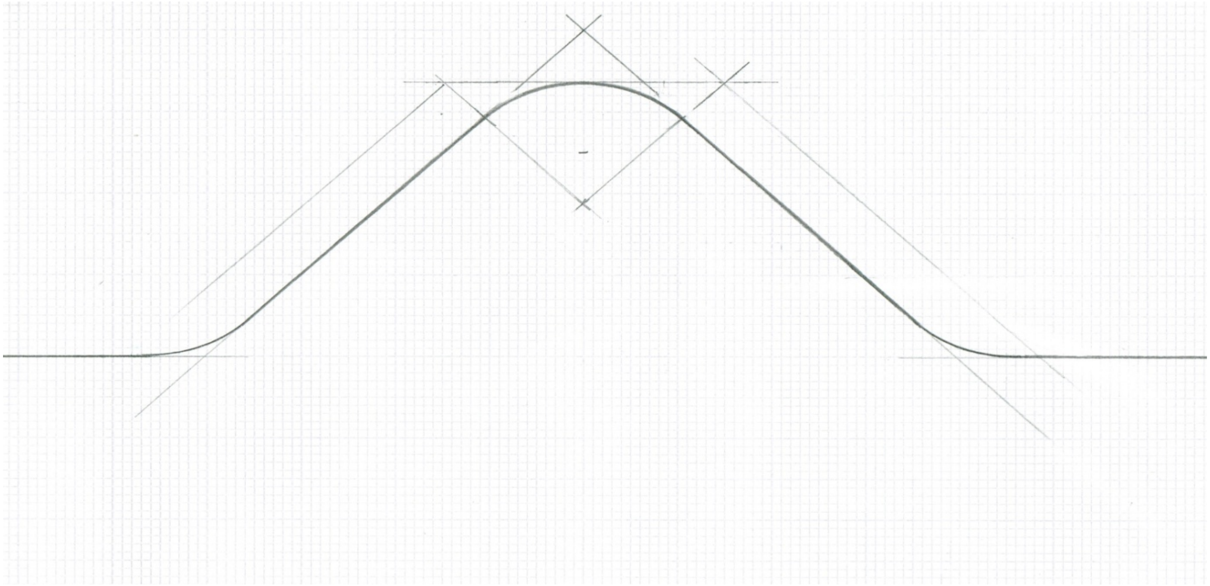

Fig.4. Showing the geometry of the radius, as opposed to a truncated triangular form.

New Winding Hole provision

In addition to ensuring restoration and maintenance of existing turning places, the need to consider conservation of water resources suggests ensuring that boats can turn either side of lock flights, and at either end of ‘summit pounds’ – in order to reduce unnecessary lock usage. Going through a lock (or several), just to turn, is clearly a waste of water – but this is the case in several places (e.g. Oxford Canal). This can sometimes be met through new marina entrances, if written into access agreements, but otherwise new winding holes could be beneficial to both the navigation authority *and* commercial and private boating interests. This suggestion could be combined with other initiatives for water-saving such as greater depth on summit pounds, restoration of side-ponds (after the good Droitwich Canal example), restoration of ‘duplicated’ locks, e.g Trent & Mersey Canal in Cheshire, and of course, marina and arm entrances mentioned earlier (which also add to ‘water area’ in a level, and therefore storage).

Impact of Winding Holes on Water quality and environment

It has to be said that when a boat of ‘full’ size for a winding hole is turned, there is often considerable disturbance of silt as the propeller passes the ‘tight-spot’ by the towpath. This is usually because of insufficient, or previously disturbed dredging, but it can also be because of an encroachment into the winding hole ‘point’ by falling soil or rubbish, or just accumulation of silt preventing the bow touching the full extent of the intended space. This can sometimes be exacerbated if a stream enters at the point, as in a few cases (e.g. on the Caldon Canal, Llangollen, and others). The inclusion of an element of ‘clearance’ in the length L_t will help to ensure space for the propeller and rudder to work correctly, and to obviate too much turbulence and erosion on the tow-path bank. The longer-term advantage is that less turbulence will ensure clearer water, and a healthier water environment, for fish etc., as well as less frequent dredging required.

The bank protection, whether steel piling, concrete or masonry, usually provides some stability to the form of the winding space, and around the arc of the radius, must be strong enough for the bows to rest against it, while the engine is used to power the turning operation. A suitable height of such protection is also necessary for the typical craft of the canal – or frequent use could cause more wear and therefore silt, and damage to boats, than intended.

David W. Struckett, on behalf of IWA Navigation Committee
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