

Ujenzi wa Mifereji / Canal Lining

Ujenzi wa mifereji au sehemu za mifereji huzingatiwa ili kudhibiti mwendo kasi wa maji na upotevu njiani. Ujenzi huu unaweza kufanyika iwapo kutakuwa na matatizo yafuatayo:-

- Kingo dhaifu za mifereji (kubomoka mara kwa mara)
- Iwapo mfereji unapita maeneo yenye miamba.
- Iwapo mfereji utakuwa umeharibiwa ama kubomolea na mafuriko kutoka kwenye mto.
- Iwapo mfereji unapoteza maji mengi njiani.
- Iwapo mfereji unapita katika maeneo yenye mteremko mikali.

The canal lining or canal sections, may be considered to save certain conveyance problems such as the following:-

- *Unstable canal banks (frequent breakages)*
- *Canal passes along a rock face. Here the lined canal may have to be supported.*
- *Canal damaged by floods from rivers or gullies.*
- *High seepage losses (e.g. Channel in sandy soils)*
- *Steep eroding canal section.*

Faida

- Ongaezeko la uwezo wa mfereji kutokana na mtiririko mzuri wa maji.
- Kuwa na mgawanyo mzuri wa maji kutokana na upatikanaji wa kutosha (hayapotei)
- Ukarabati wa mara kwa mara hupungua
- Mkusanyiko wa matope au mchanga ambao hupunguza uwezo wa mfereji, unaweza kuonekana na kundolewa kirahisi

Advantages

- *Increased canal capacity through increased flow capacity*
- *Increased availability of water and equality of distribution through reduced water losses.*
- *Decrease of maintenance requirements although sedimentation can still occur in lined canals, reducing their capacity, this can easily be cleaned.*

Hasara

- Ni ngarama kubwa kujenga
- Inahitaji sana utaalumu kwa ufanisi. (mafundi mchundo)
- Inahitaji usafiri ili kuweza kusafirisha vifaa vya ujenzi

Disadvantages

- *High construction*
- *Requires skilled labour*
- *May require transport to transport materials*

Aina za ujenzi wa Mifereji

Zipo aina mbali mbali za ujenzi wa mifereji nazo ni:-

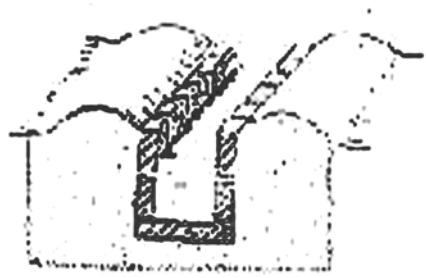
- Ujenzi wa zege la moja kwa moja baada ya kupata vipimo na umbo kamili la mfereji (cast in situ)
- Ujenzi kwa kutumia vigaa - Njia hii hurahisisha sana ujenzi na ni rahisi kusafirisha (ie. Ni rahisi kwa wakulima kuvibeba kuvipeleka kwenye eneo la ujenzi)
- Kwa kutumia matofali ya mchanganyiko wa saruji na mchanga. Matofali haya hutayarishwa kama vile matofali ya ujenzi nyumba. Kitako cha mfereji/sakafu hujengwa kwa zege na matofali hutumika kujengea kuta za mifereji.
- Ujenzi wa mawe kwa kuunganisha na mchanganyiko wa saruji na mchanga. Mchanganyiko huu huwa katika uwiano wa 1:2 au 1:3. Uso wa mfereji unaweza kupigwa kioo ili uweze kuwa laini.
- Ujenzi kwa kutumia udongo wa mfinyanzi. Udongo wa mfinyanzi ukiwa na unyevu wa wastani unasindiliwa kwa unene wa sentimita 15-30. Kwenye kuta za mfereji. Baada ya kazi hii mfereji hutengenezwa au kuchimbwa kufikia vipimo vilivyo kusudiwa.
- Ujenzi wa kutumia mchanganyiko wa saruji na udongo wa mfinyanzi wakati ukiwa umekauka.

There are several types of canal

- “ *Cast in situ* - After the required canal shape and dimensions have been obtained by excavation, a layer of concrete is poured and being leveled to the required thickness using smooth board. Sometimes form work is needed.
- “ *Pre-cast tiles/ elements* - This type of lining has an advantage of easy implementation using minimum skills and easy to transport i.e. carried by farmers to the construction site
- “ *Sand-cement blocks* - These are prepared the same way blocks used in house construction are made. The canal bed is cast in-situ concrete and blocks are used to make masonry side wall.
- “ *Clay bricks (burned bricks)* - These can be used in a same way as sand-cement blocks channel. After this the required cross section of the channel is excavated.
- “ *Stone masonry* - Natural stones are glued together by sand and cement mortar with a ratio of 1:2 or 1:3. The surface might be plastered to get an increased smoothness.
- “ *Clay lining* - Clay soils at an optimum water content is compacted in layers of 15-30 cm thick of the channel. After this the required cross-section of the channel is excavated.
- “ *Soil-cement* - Portland cement is added to soil with a high content of fines (e.g. Clay or clay loam) in the ratio of 1:10 when dry. Water is added to the soil - cement mixture content. This material is placed in 10 cm. thick layers along the canal bed and sides and compacted.

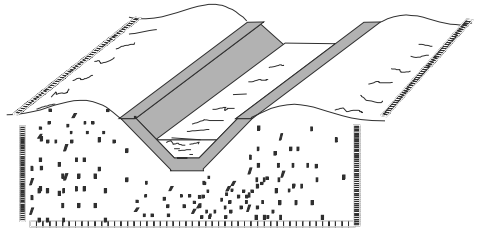
Mfano wa ujenzi wa mifereji:

Examples of canal lining:



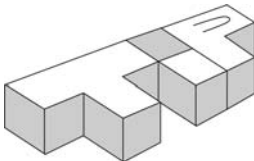
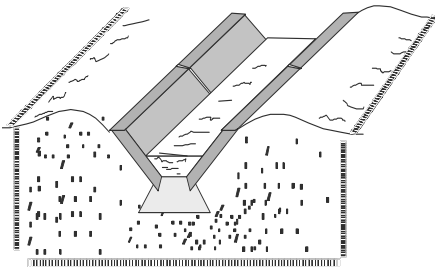
Kwa kutumia matofali (6" x 9") kitako sm 10

Quarry blocks (6"x 9") on concrete floor 10cm.
Kwa kutumia mawe na zege kwenye kitako cha mfereji.



Natural stones embedded in concrete
Kwa kutumia vigae na zege kwenye kitako cha mfereji.

Concrete bottom (10cm) and concrete tiles.



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