

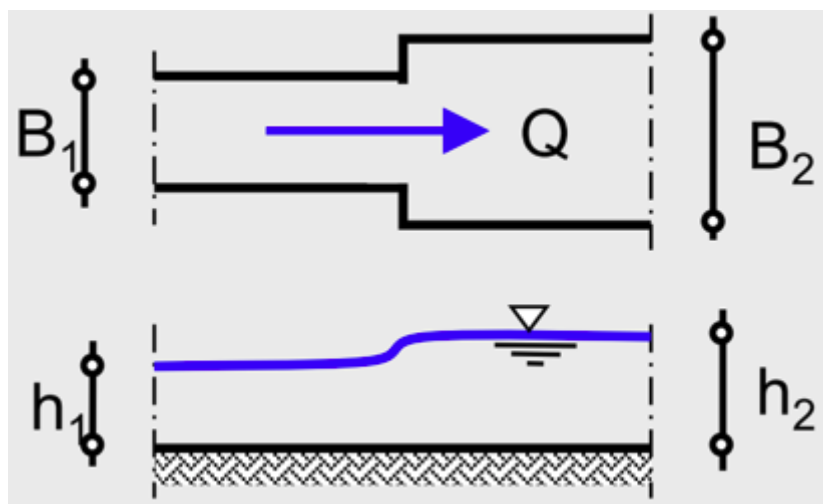
FLUME 3 – SINGLE LOSS BECAUSE OF EXTENSION

DESCRIPTION

This example illustrates a single loss occurring when the cross section of a flume abruptly changes.

Given:

- $Q = 0.5 \text{ m}^3/\text{s}$
- $h_2 = 0.6 \text{ m}$
- $l_s = 0.2 \%$
- $K_{st} = 75$
- $H = 1 \text{ m}$
- $B_1 = 0.6 \text{ m}$
- $B_2 = 1.2 \text{ m}$
- $L = 0 \text{ m}$. Leave the length of the flume or flumes empty in this case. This will deactivate the calculation of friction losses.

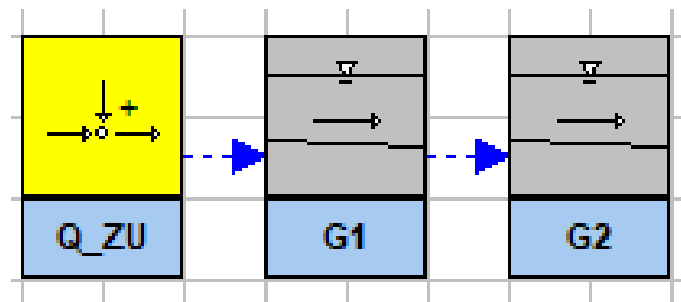


TASK

Determine the flow depth h_1 at the flume inlet.

SYSTEM ABSTRACTION IN HYBEKA

The system is very simple. To represent it, we only need a flow changer to represent the inflow into the flume and two open channel elements for the flume itself.



DATA INPUT

General settings:

waterlevel at end of system [mas]

The water level at the system outlet is given by the user. Note that it must be given in the unit masl.

Flow changer Qzu:

HYBEKA for windows input of data

HYBEKA Ergebnisse Plot

data in detail | system | geometry | hydraulic losses | count elements

system/flow path

description of element	element	inlet	outlet	division	Qin/Qout
Zufluss	Q_ZU		G1		500,00

insert division-line
 elements of *.ERK file
 create *.TAU file
 no plotting

geometry

longitudinal section			losses		cross section			upstream	cross section			downstream
zo	zu	L	k	c	T	hs	h	B	T	hs	h	B
100			75		T		1	0,6				

adjust invert level

hydraulic losses

losses			coefficient		dimensions			comments					
hve	Zeta1	Zeta2	μ	n(c)	T	h,D	Bu	Bo					
									number dist. n a				

zeta-table

Q_ZU
 G1
 G2

*.PKL check

A B D G M P Q R S T U V W Z find continue close

Flume element G1:

HYBEKA for windows input of data

HYBEKA Ergebnisse Plot

data in detail | system | geometry | hydraulic losses | count elements

system/flow path

description of element	element	inlet	outlet	division	Qin/Qout
Gerinne (B = 0,6 m)	G1	Q_ZU	G2		

insert division-line
 elements of *.ERK file
 create *.TAU file
 no plotting

geometry

longitudinal section			losses		cross section			upstream	cross section			downstream
zo	zu	L	k	c	T	hs	h	B	T	hs	h	B
100					T		1	0,6				

adjust invert level

hydraulic losses

losses			coefficient		dimensions			comments
hve	Zeta1	Zeta2	μ	n(c)	T	h,D	Bu	Bo

number dist.
n a

zeta-table

- Q_ZU
- G1**
- G2

Navigation icons: back, forward, search, etc.

order

- flow path
- element

*.PKL

check

A B D G M P Q R S T U V W Z | find | continue | close

Flume element G2:

HYBEKA for windows input of data

HYBEKA Ergebnisse Plot

data in detail | system | geometry | hydraulic losses | count elements

system/flow path

description of element	element	inlet	outlet	division	Qin/Qout
Gerinne (B = 1 m)	G2	G1	ENDE		

insert division-line elements of *.ERK file create *.TAU file no plotting

geometry

longitudinal section			losses		cross section			upstream	cross section			downstream
zo	zu	L	k	c	T	hs	h	B	T	hs	h	B
100					T		1	1				

adjust invert level

hydraulic losses

losses			coefficient		dimensions				comments
hve	Zeta1	Zeta2	μ	n(c)	T	h,D	Bu	Bo	

number dist.
n a

zeta-table

Q_ZU
G1
G2

order
 flow path
 element

*.PKL
check

A B D G M P Q R S T U V W Z find continue close

RESULTS:

i	element	Q	discharge [m³/s]	length [m]	invert [masl]	board level [m]	water level		welled oss-sectic [m²]	velocity [m²/s]	energy level [masl]	shear stress [N/m²]	Pr o/g	losses [m]				comment
							[m]	[masl]						frict.	single (1)	single (2)	transit.	
▶ 1	Q_ZU	1	0,500	0,000	100,000	1,000	0,546	100,546	0,33	1,53	100,665	7,02	o				0,000	
1	G1	1	0,500		100,000	1,000	0,546	100,546	0,33	1,53	100,665	7,02	o	0,000	0,000			V
2	G1	1		0,000	100,000	1,000	0,546	100,546	0,33	1,53	100,665	7,02	o				0,029	V
1	G2	1	0,500		100,000	1,000	0,600	100,600	0,60	0,83	100,635	1,87	o	0,000	0,000			
2	G2	1		0,000	100,000	1,000	0,600	100,600	0,60	0,83	100,635	1,87	o				0,000	

The water level at h₁ is 0.546 m.