

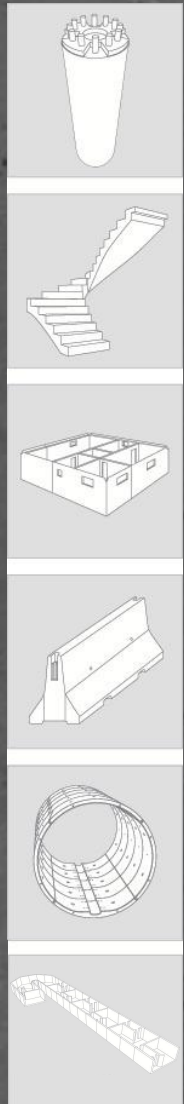
Maba Fertigteilindustrie

enature® fishpass, research and
development, practical examples

20.02.2014

Romanian HydroPower, Energy Summit 2014

Dipl.-Ing. Michael Pötsch

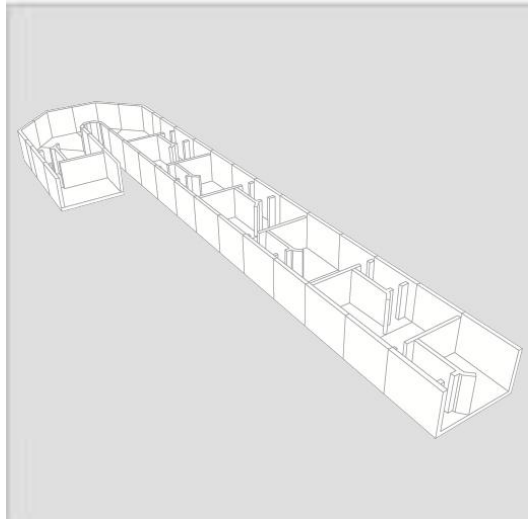
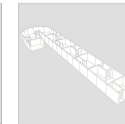
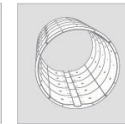
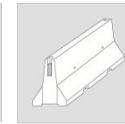
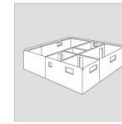
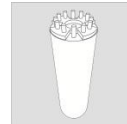


KAMA
BETONFERTIGTEILE

COMPETENT & RELIABLE

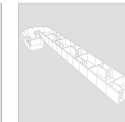
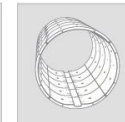
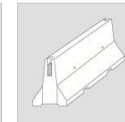
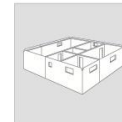
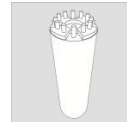
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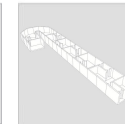
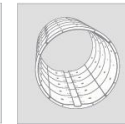
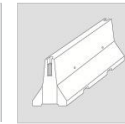
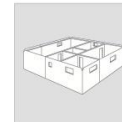
enature[®] FISHPASS

- types
- target, research & development
- result, tools for the operator
- projects



- bypass channel
- pool pass
- rock ramp
- vertical slot





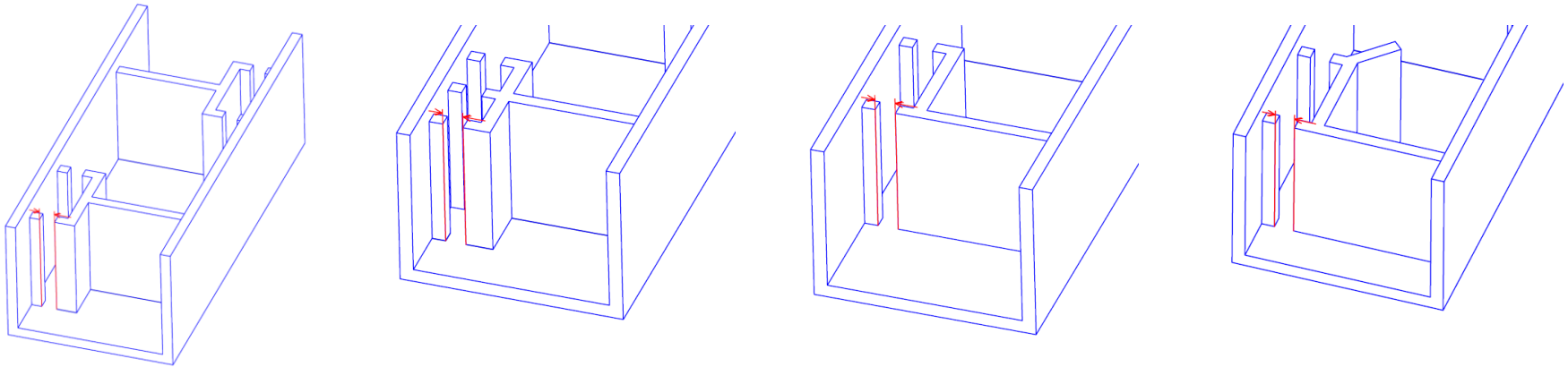
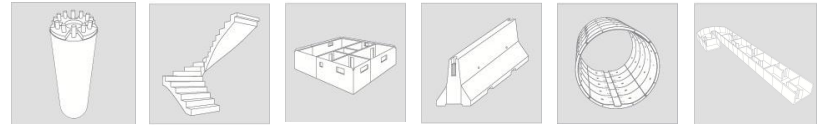
target



optimize fish migration
minimize water flow rate

result

standardized precast
concrete system
EU patent



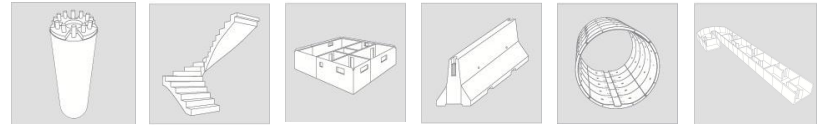
1:5 model

test new structures

physical model

- 3D velocity
- turbulences

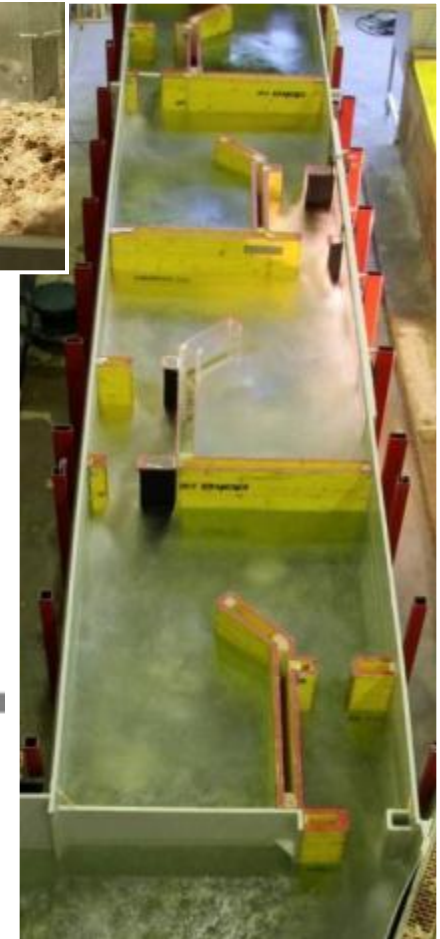




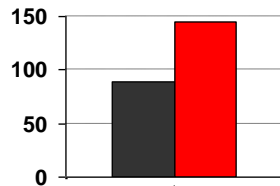
1:1 physical model

34 type

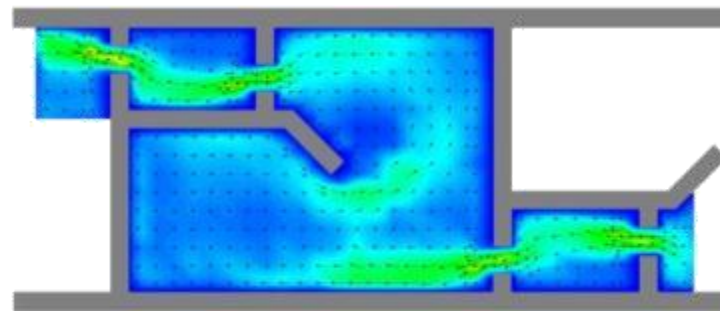
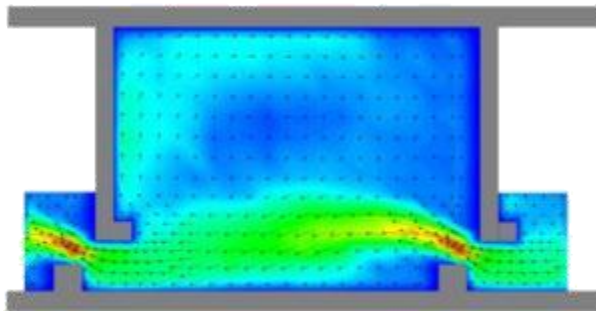
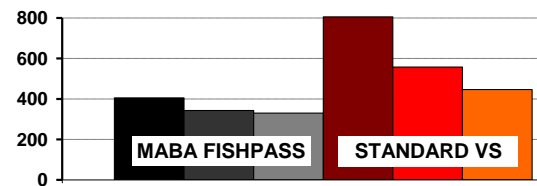
(pool length, width, slotwidth, angle ...)



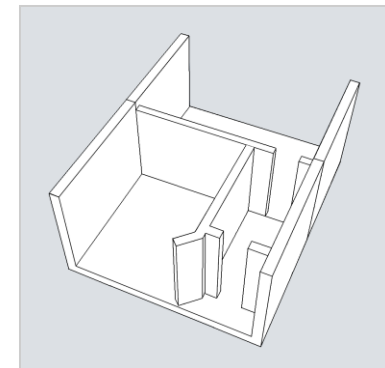
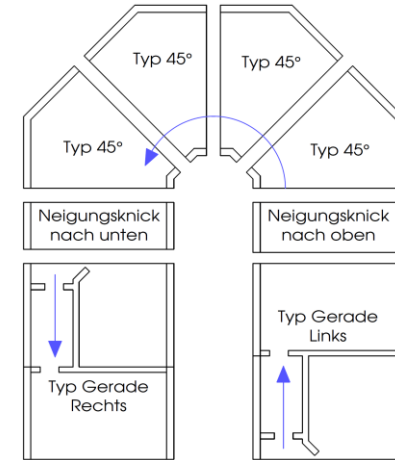
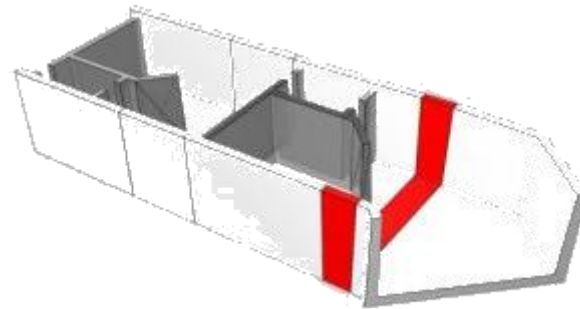
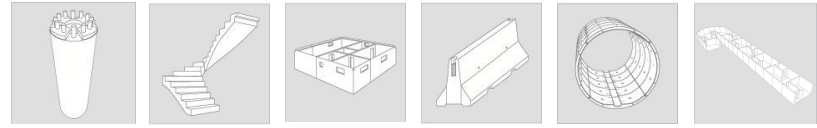
flow rate l/s



turbulent kinetic energy cm^2/s for all level



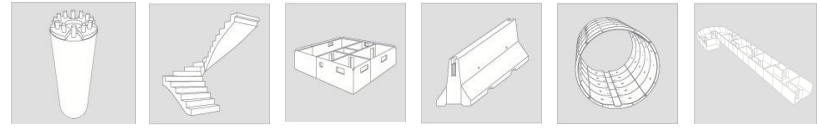
velocity cm/s
near ground level



standardization

3 system sizing

pool length	200 / 300 / 400 cm
pool width	145 / 217 / 290 cm
slot	15 / 20 / 25 / 30 / 35 / 50 cm
delta H	10 / 13 / 15 / 17 / 18 / 20 cm



hydrauliktool

www.maba-fishpass.com

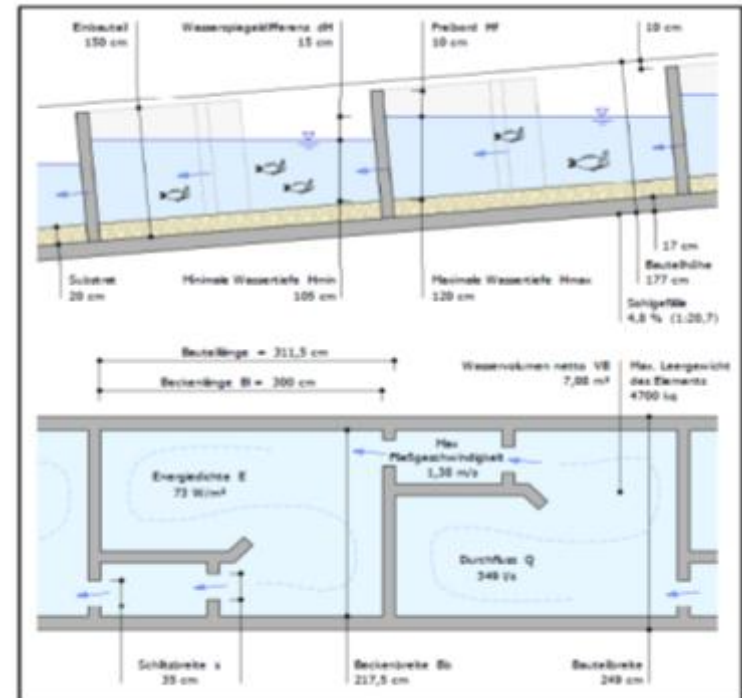
Standard Vertical Slot:
flow rate: **563 l/s**
dissipation: **113 W/m³**

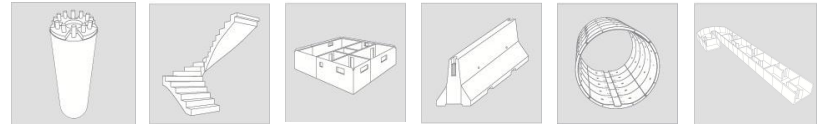
enature FISHPASS:
flow rate: **349 l/s**
dissipation: **73 W/m³**

- ⇒ **38% reduced flow rate**
- ⇒ **36% reduced dissipation**
- ⇒ **20% reduced velocity**

ENTWURF EINES ENATURE FISHPASSES
SYSTEMTYPISCHES MITTEL

Systemgröße: Auswahlverfahren:	MITTEL Systemgröße Vorgabe min. Wasserstand	Vertical Slot dimensionsgleich	enature Fishpass	Unterschied
Durchfluss	563 l/s	349 l/s	-38 %	
Energieverlust	113 W/m ³	73 W/m ³	-36 %	
Max. Fließgeschwindigkeit	1,72 m/s	1,38 m/s	-20 %	
Schüttbreite	20 cm	20 cm	0 %	
Wasserhöhe-Differenz	15 cm	15 cm	0 %	
Min. Wasserhöhe	105 cm	105 cm	0 %	
Beckenbreite-Länge	217,5/300 cm	217,5/300 cm	0 %	

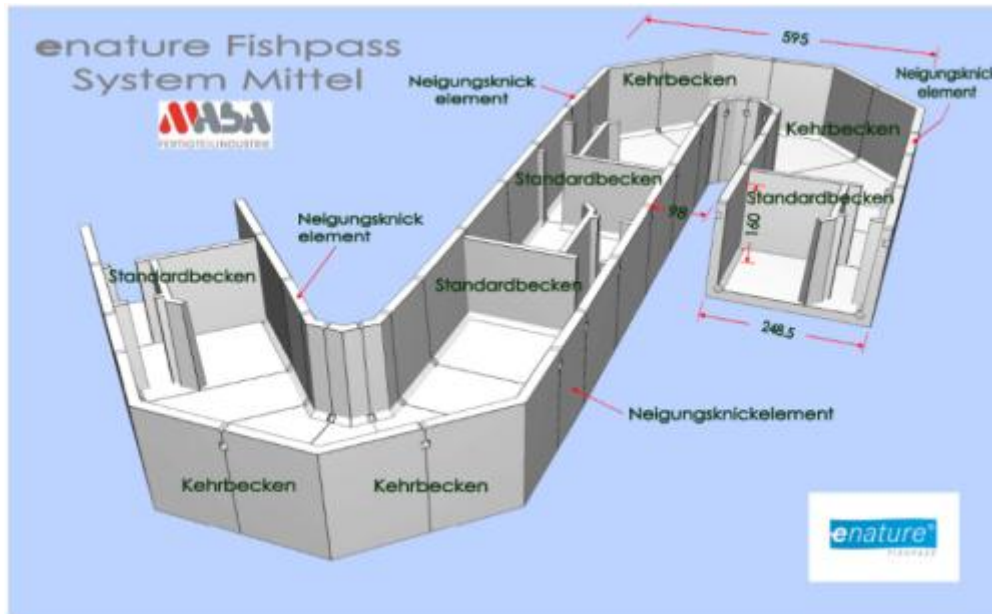




2D and 3D planningtool

download

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SYSTEM MITTEL
dH = 15 cm / Becken
s = 35 cm
2D

GRUNDRISS - SET
für Neigung dH = 15cm von Becken zu Becken
für Schlitzbreite s = 35cm

- Neigung des Ft. bereits auf eine Wasserspiegeldifferenz von 15cm pro Becken inkl. 0,5cm Fuge berücksichtigt!
- Im Grundriss an den Knotenpunkten (-) einfach aneinander fügen!
- Auf Neigungsknickelement vor und nach Kehrbecken nicht vergessen!
- Kehrbecken und Neigungsknickelemente werden stets auf horizontalem Untergrund versetzt!
- Die Standardbecken werden in der vorgesehenen Neigung versetzt!

NEIGUNGSKNICKELEMENT
von horizontal auf aufsteigend geneigt

GEW. 2425kg

NEIGUNGSKNICKELEMENT
von horizontal auf abfallend geneigt

GEW. 2150kg

45° KEHRBECKEN

GEW. 1500kg

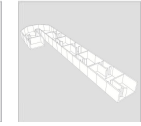
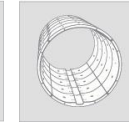
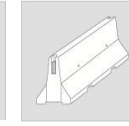
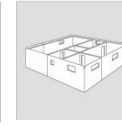
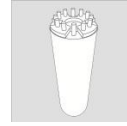
STANDARDBECKEN
Schlitz orographisch links
bestehend aus 2 Fertigteilen

GEW. 4225kg

STANDARDBECKEN
Schlitz orographisch rechts
bestehend aus 2 Fertigteilen

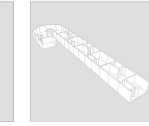
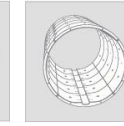
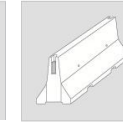
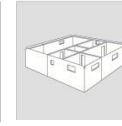
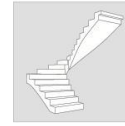
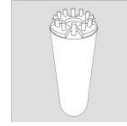
GEW. 4275kg

Version: A		V6278007 / 2
04.11.2010 / RG		13.09.2010 / RG
MAUS: 1:75		



St. Katharein
river Laming
28 pools

Hart
river Ager
19 pools



Bolzano, Italy
river Talfer
43 pools
4 resting pools



enature®
FISHPASS

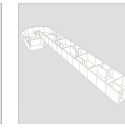
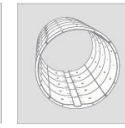
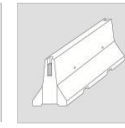
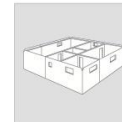
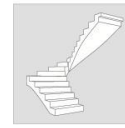
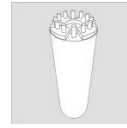
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