

Symposium: “Strijd tegen water”

Door: Johann van den Noort

Datum: 5 oktober 2015

Symposium: “**Bescherming tegen water**”

Door: Johann van den Noort

Datum: 29 september 2015



Atlantic coast, oil painting, 160 x 300 cm

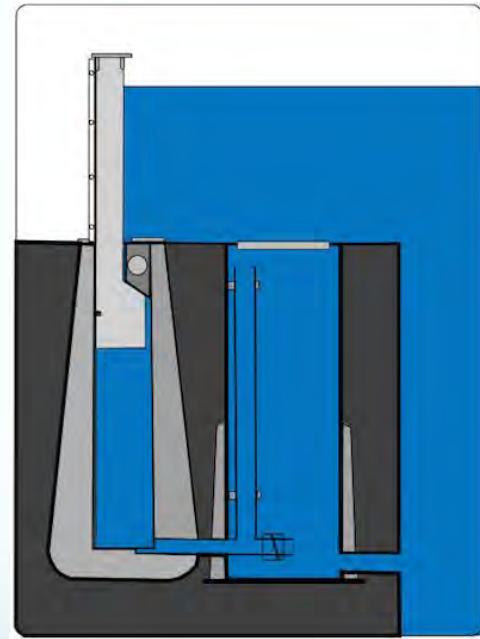
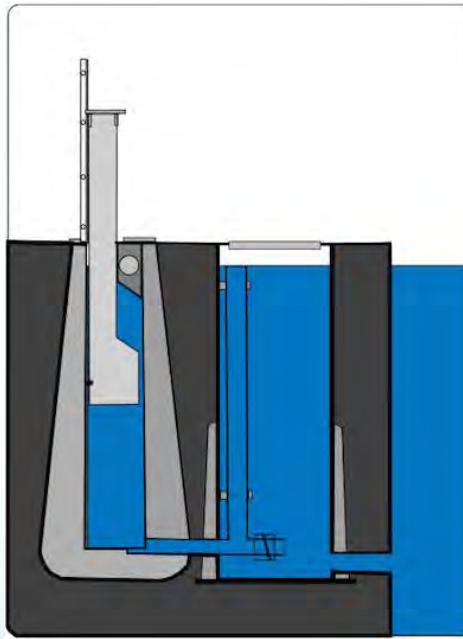
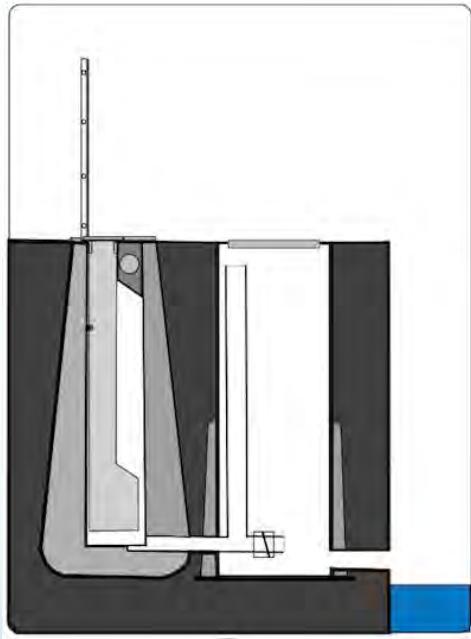
scfb[®]
self closing flood barrier

Temporary flood barriers





Working principle of the SCFB



“Using the power of water”

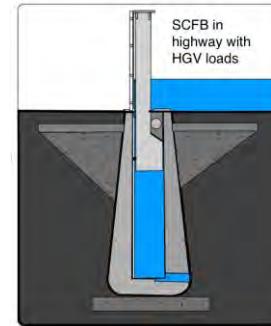
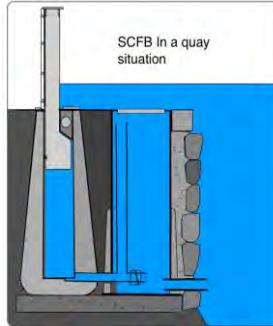
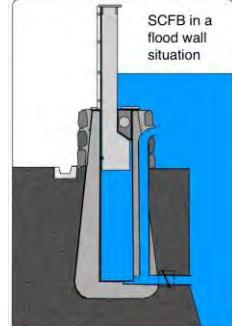
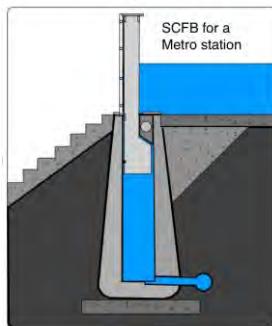
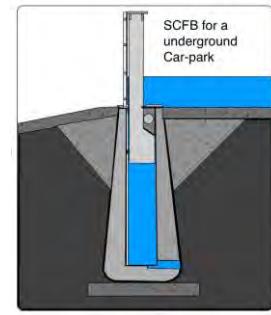
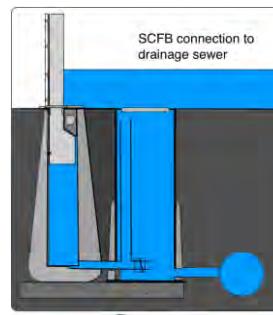
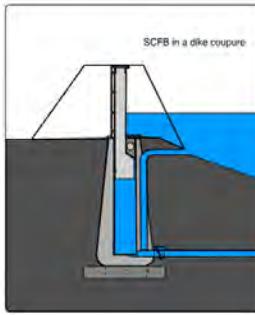
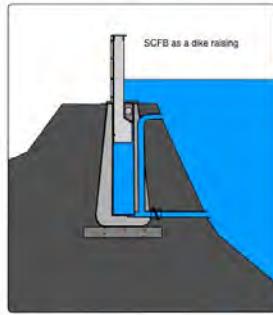
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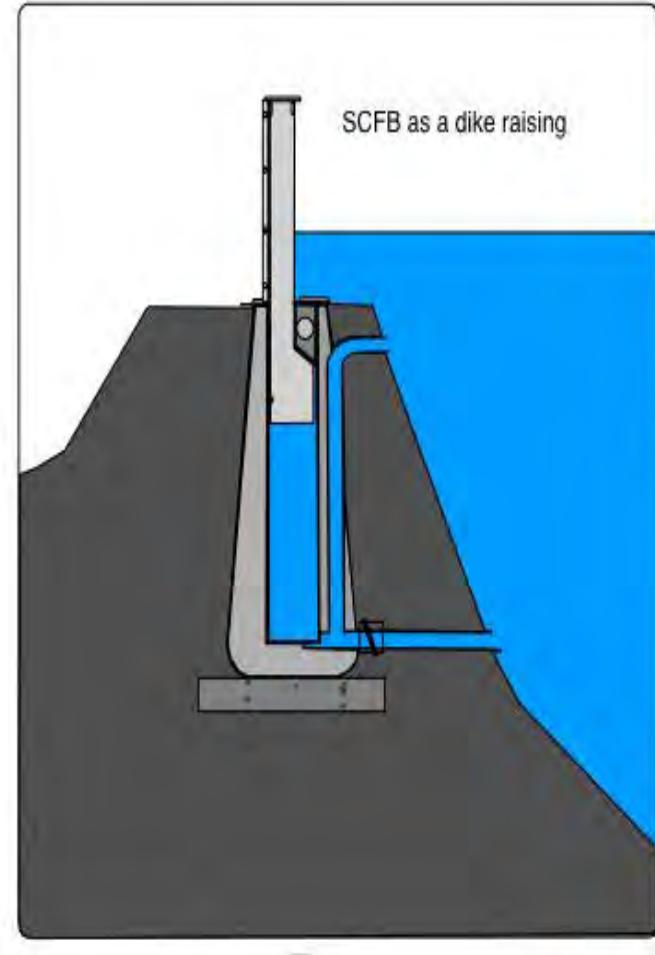
Working principle of the SCFB



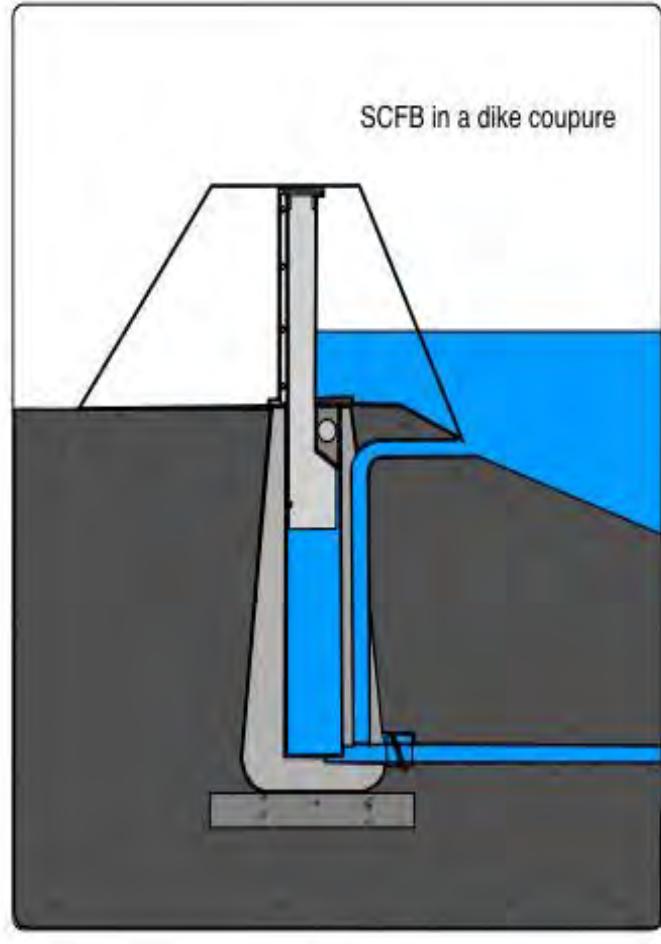
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self closing flood barrier

SCFB Application possibilities &

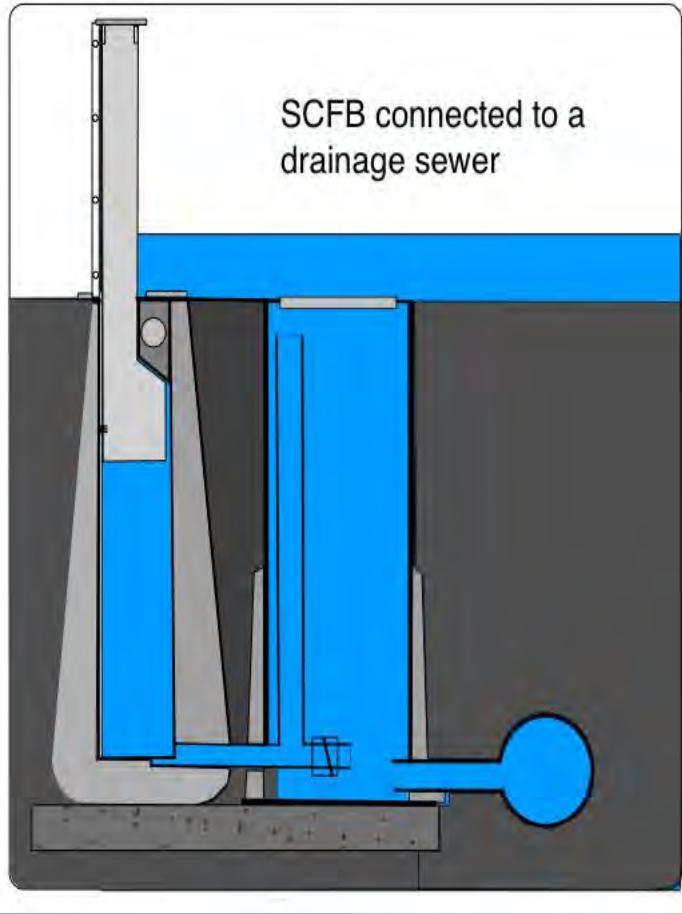




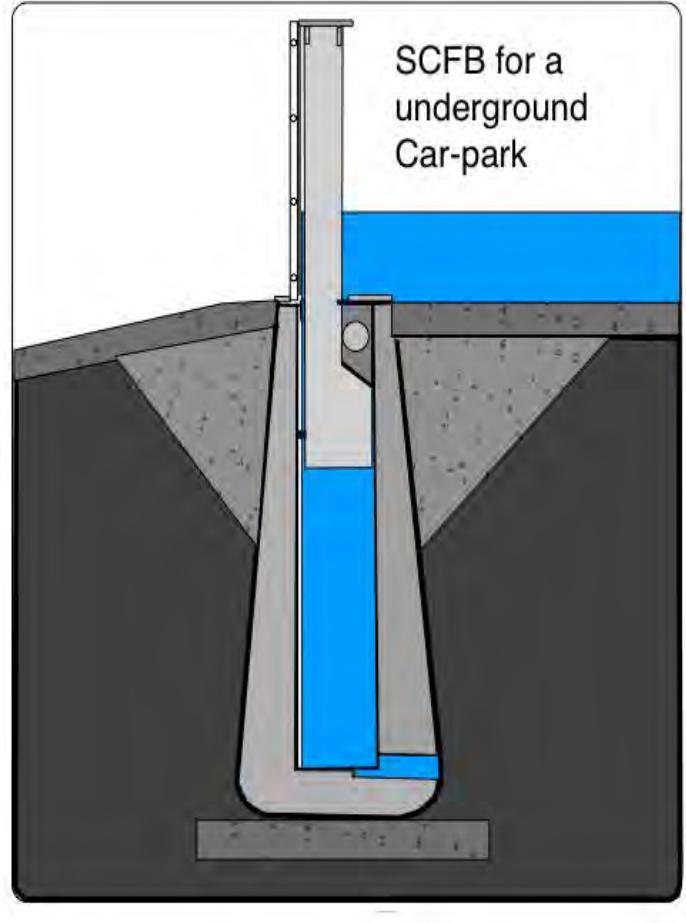
It is not longer necessary to raise dikes and therewith affecting the natural landscape permanently. With the SCFB system you get a stronger dike and only a temporary raising when it is necessary



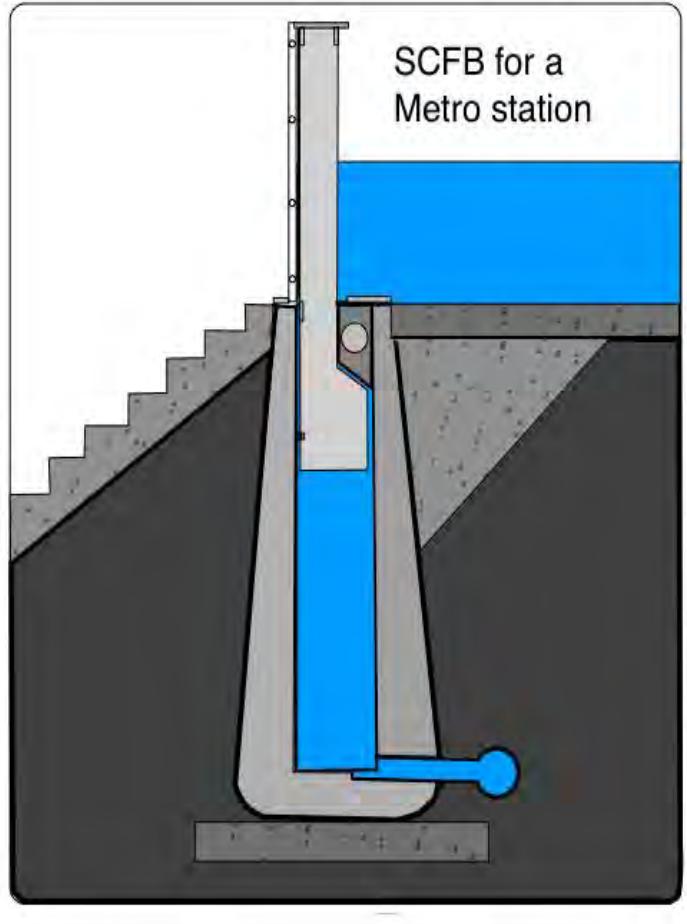
Coupures in dikes give always a manual operating failure probabilities by closing. The SCFB needs no human intervention and gives always a full protection.



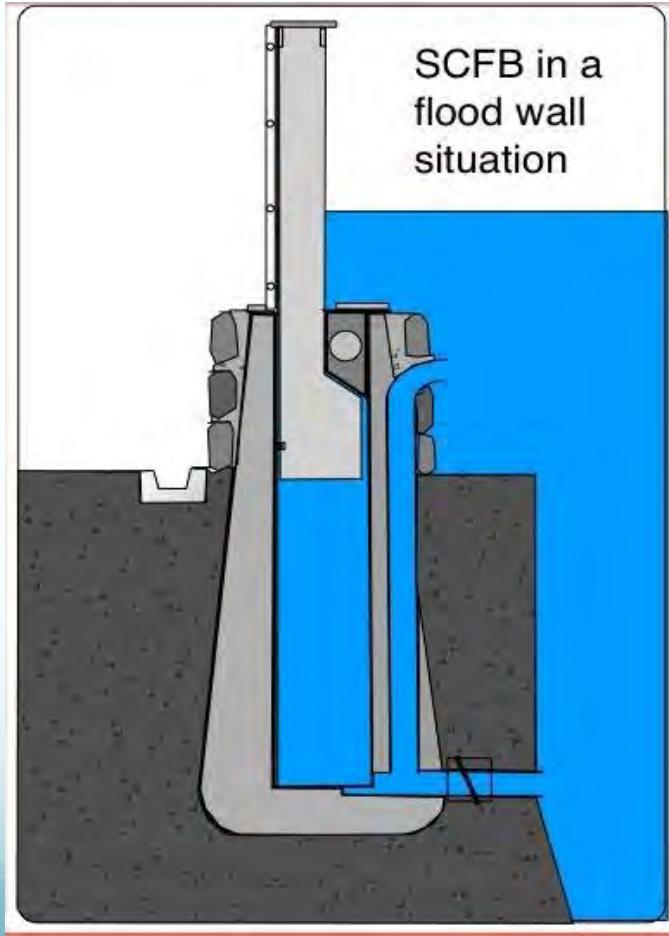
In urban situations where there is no waterway the SCFB can be used in every street by connecting it to a drainage sewer. Herewith the SCFB can protect shops, banks, offices, power stations, private property etc.



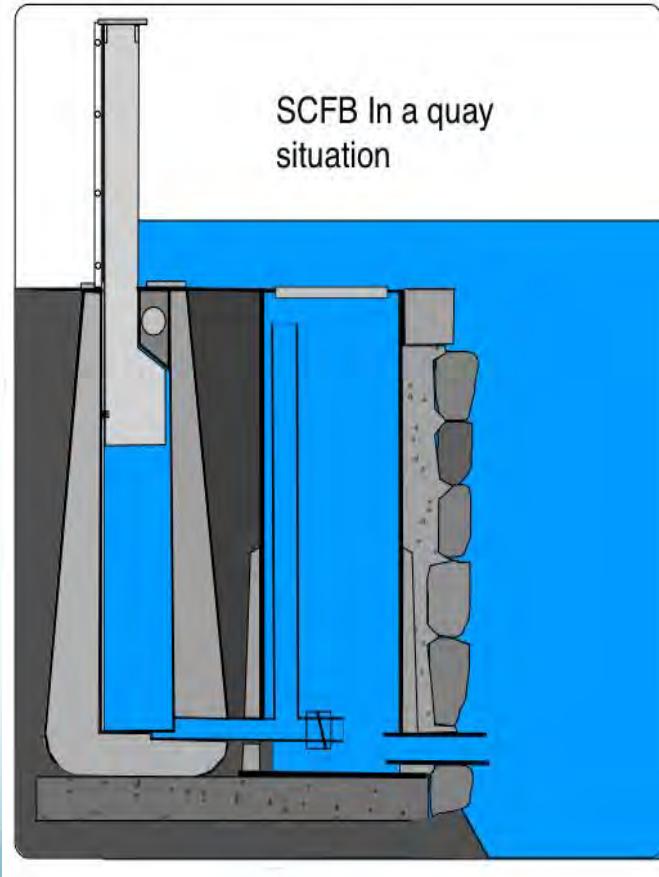
Underground Car-Parks are dangerous special for fast floods. In many cities it is not permitted to build an underground car-parking in flood areas when these car-parks are not protected with the SCFB. With a fast flood the SCFB will close 100% waterproof within a minute.



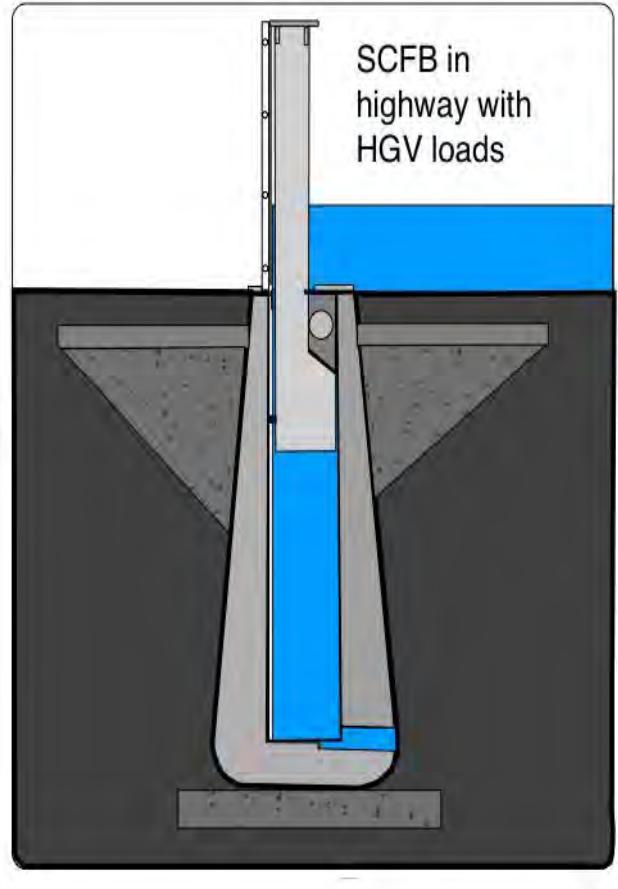
Metro's and metro stations are vulnerable for floods. Urban floods have brought thousands of metro travellers in danger. The SCFB at the entrance of these stations will protect people for this danger.



In quay situations where the view of the environment is important and where it is not possible to build a high permanent wall, the SCFB is the right solution. With the SCFB in a low wall it is easy to get a solid and high protection without losing the view.



In a quay situation along a waterway or river the SCFB offers a good protection till unlimited lengths. Cities and villages along side can now be protected by fast rising tides.



Even along or across a highway or railway with heavy loads the SCFB can resist floods. For this situation special concrete plates protect the barrier against these heavy loads.

River Schelde

Country	Belgium
Place	SCHELLE BELLE en HOBOKEN
Type	SCFB 1500 S
Year	2010
Height	1,50 meter
Wide	4 barriers total 20 meter



scfb
self closing flood barrier

US National Archives

Country	USA
Place	Washington DC
Type	SCFB 2500 C
Year	2012
Height	2,50 meter
Wide	2 barriers of 8 meter



The Archive was saved by this barrier during Sandy

scfb
self closing flood barrier

Cockermouth

Country	UK
Place	Cockermouth
Type	SCFB 1250 C
Year	2012
Height	1,25 meter
Length	135 meter



In 2009 this town had a flood of 3 meter high

CARRICK ON SUUR

Country	Ireland
Place	CARRICK
Type	SCFB 1250 S
Year	2000
Height	1,25 meter
Wide	2 barriers of 3 meter



These barriers has protected the town all over 2000 times



Carrick-on-Suir

FOR HERITAGE AND LEISURE

March 2013, Carrick-on-Suir Town Council, Ireland

Two SCFB's where installed in 2002 along the tidal river Suir.

"I cannot tell you accurately how many times the barriers rise; they sometimes rise twice a day when there are high tides in very wet conditions with a lot of flood water in the river. The number of times in a year is approximately 150-175 times. There has been no actual maintenance carried out on the barriers; only keeping the gullies clear, checking and lubricating seals and barriers.

"The barriers are working very well in these locations. They have always worked when needed and are doing an excellent job".

*Mr. Michael O'Shea
Town Councillor
Carrick-on-Suir Town Council*



Key benefits



NO WARNING SYSTEM and WARNING TIME REQUIRED



NO MANPOWER REQUIRED



NO STORAGE NEEDED



MAINTENANCE FREE

"The SCFB keeps the water where it belongs"

Cost Analysis of flood barriers

Criteria	SCFB	Mobile Flood Barrier		Attended Flood Barrier	
		Depreciation	Maintenance	Storage	Transportation
Depreciation	3	3	3	1	2
Maintenance	2	3	3	0	0
Storage	0	3	3	0	0
Transportation	1	3	3	0	0
Operational cost		3	0 Relatively	0	0
Closing operational cost	3	1 Acceptable cost	12 Relatively	3	5
Operational staff cost	4	3 Excessive cost	4	20	
high cost					
Total		13			



Maintenance



Maintenance free

In 15 years no repairs and or spare parts where needed.

Maintenance

1. Hydrostatic testing of each complete system intake structure to the SCFB by filling with a hosepipe.
12 monthly
2. Checking for leakage of seals at the base of the rising barrier
12 monthly
3. During the hydrostatic test. Replace seals that show signs of leakage.
monthly
4. Visual inspection of seals at the ends of the rising barrier.
12 monthly
5. Replace seals that have perished or cracked.
12 monthly
6. Testing of submersible pump(s).
12 monthly
7. Testing and cleaning of non-return flap valves in service pit.
12 monthly
8. Clean silt from service pit.
12 monthly





A product from the Netherlands

TWTB

Twin Wing Tsunami Barrier

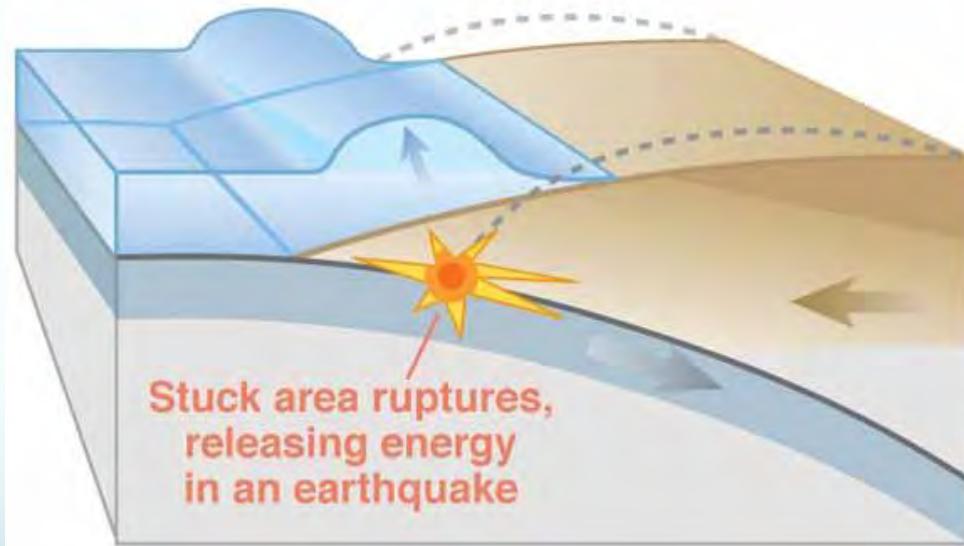


The research consisted:

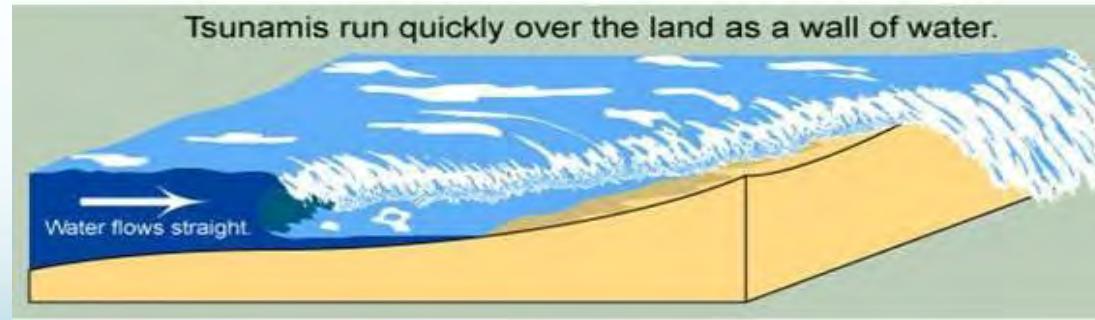
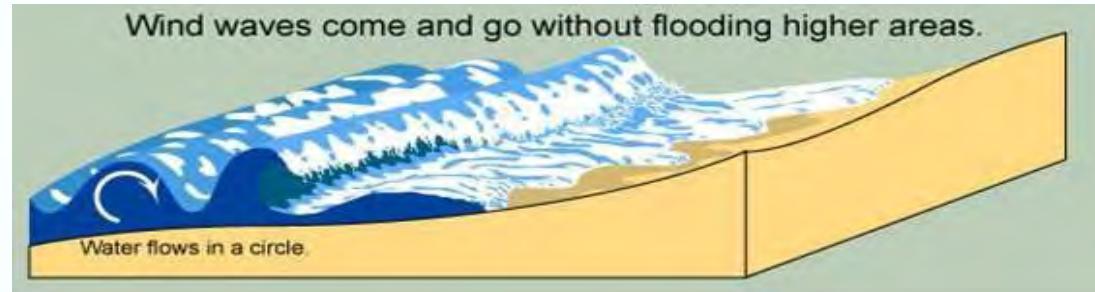
1. What is a tsunami
2. Characteristics of a tsunami, as the height, speed, forces and volumes.
3. Lab-tests with barrier wings and the influence of the waves on the wings.
4. Research of the construction of the tsunami barrier
5. Research about the foundation of the barrier
6. The best location of the barriers
7. Dimensions
8. Calculations of the strength with Ansys programs.
9. The design of the TWTB

How does a tsunami wave arise

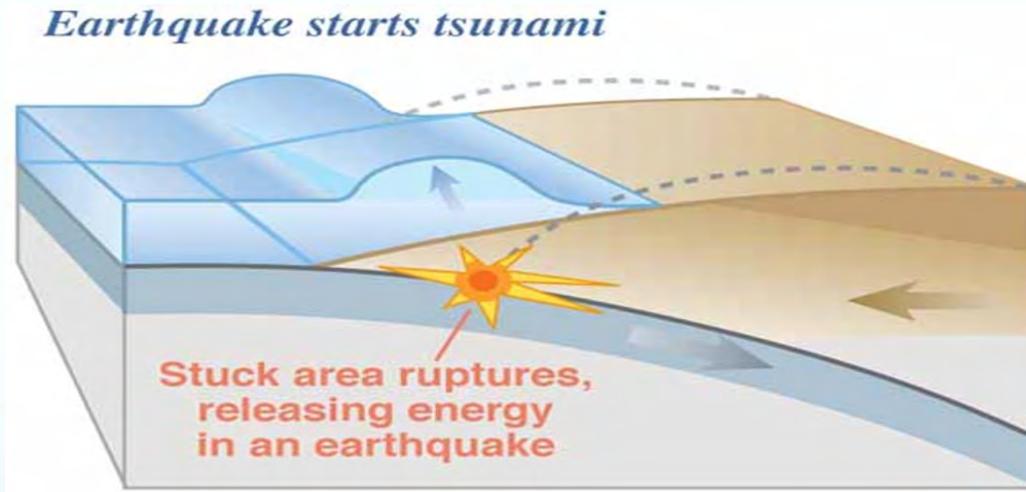
Earthquake starts tsunami



Difference between a wind and a tsunami wave.



Difference between a positive and a negative tsunami wave.



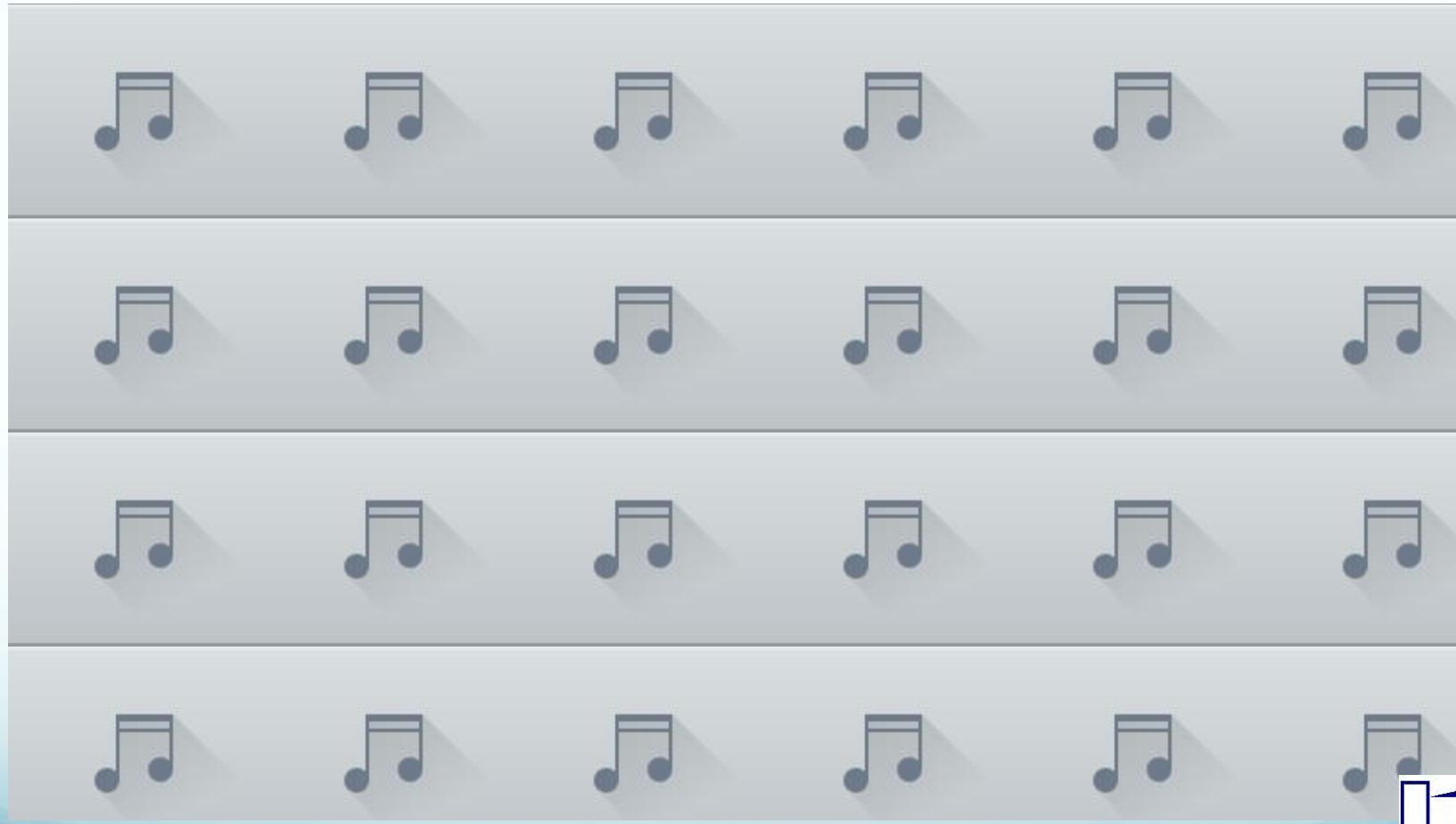
Left of the eruption the positive wave and at the right side the negative.

Example of the negative tsunami wave



Example of the positive tsunami wave





Tsunami waves

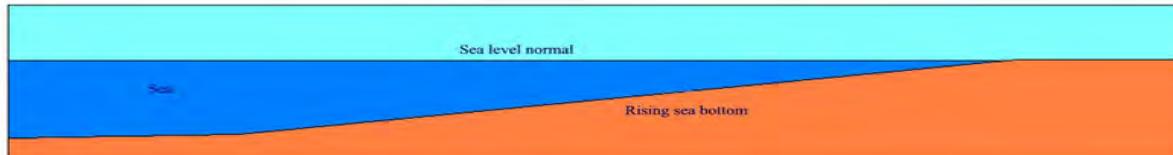
The speed of a tsunami wave depends on the dept of the water: the more dept, the higher the speed.

In a water dept of 4000 meter is the wave speed 200 m/sec (720 KM/uur), but near the shore with a dept of 10 meter the wave has only a speed of 10 m/sec/(36 km/uur).

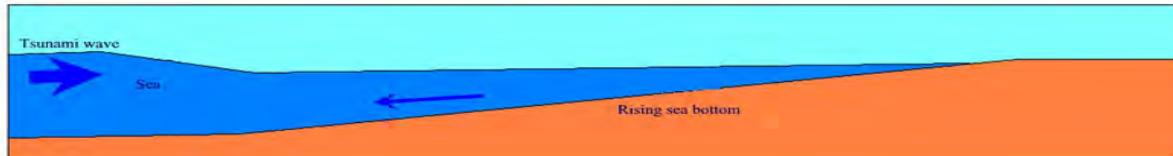
The water speed is much smaller as the wave speed. In 4000 m dept water with a wave hight of 50 cm is the waterspeed $0,5/4000$ of the wave speed or only 2,5 cm/sec. But in shallow water the wave shall increase in hight and in speed.

Creation of the positive wave after the negative wave

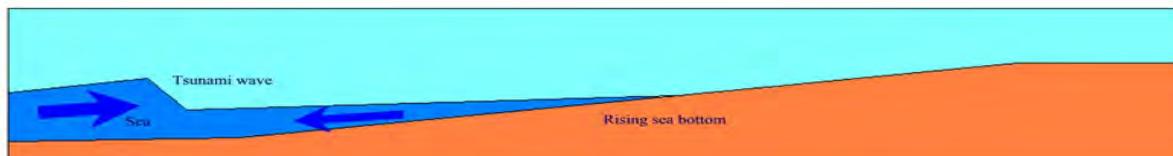
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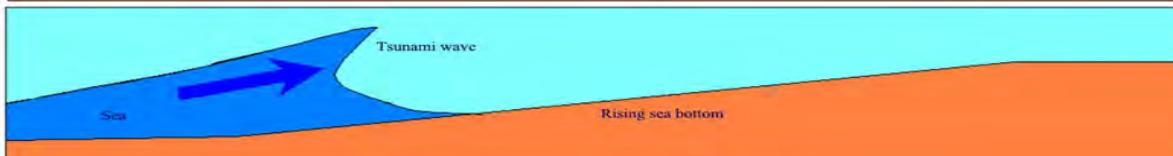
2



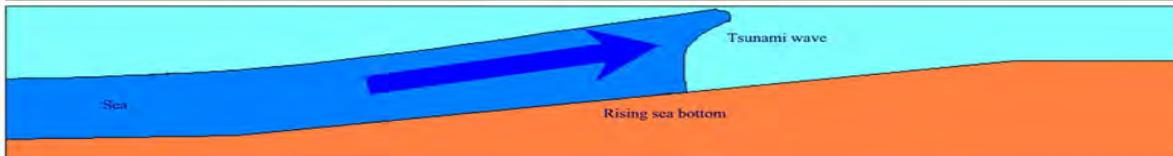
3



4



5



A tsunami consist of more waves after each other



Tsunami waves have a lenght of about 15 km with a duration between 10 and 15 minutes.

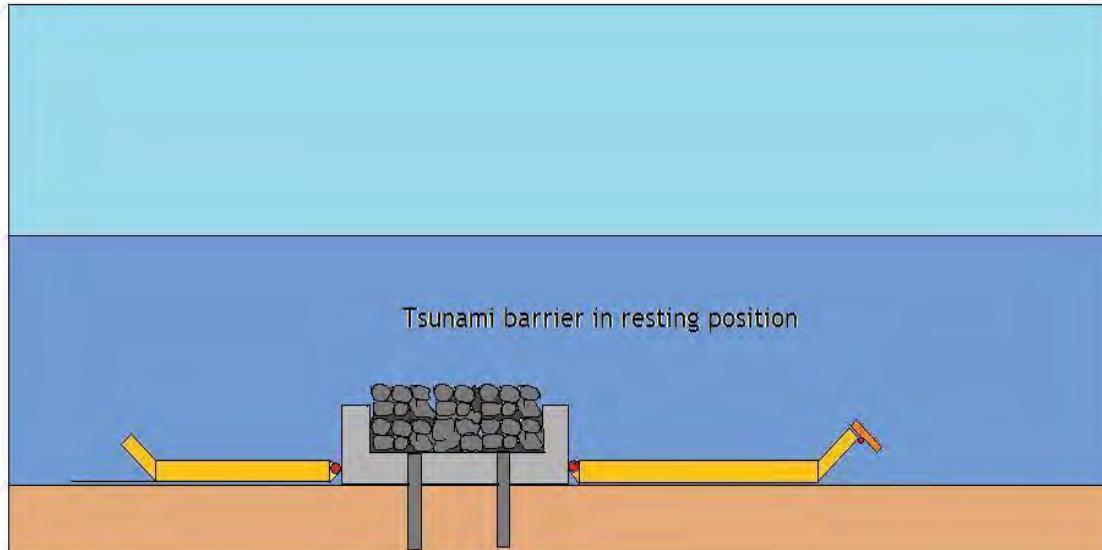
Test in the waterlab at the technical Highschool Zyud in the Netherlands



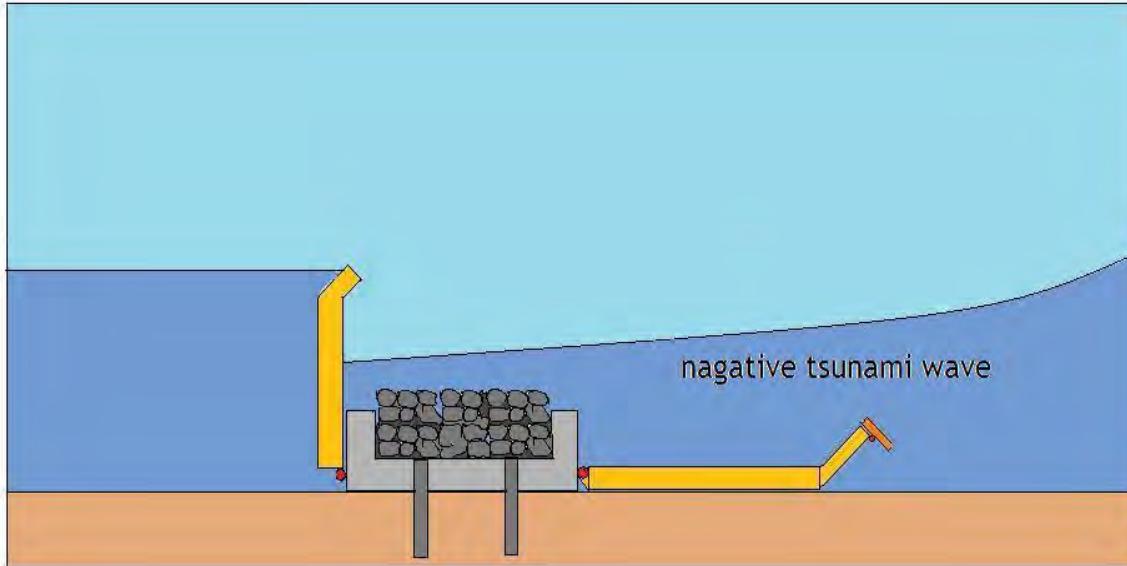
In the period 2007 till 2009 eight students with there professors did all the research about tsunami waves and the working of the TWTB



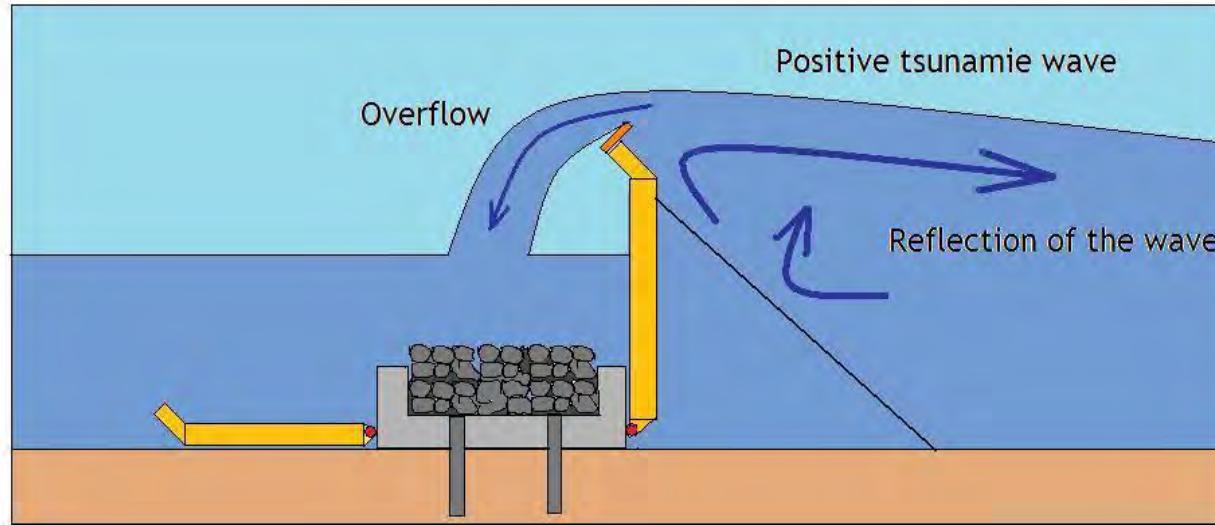
TWTB in rest position



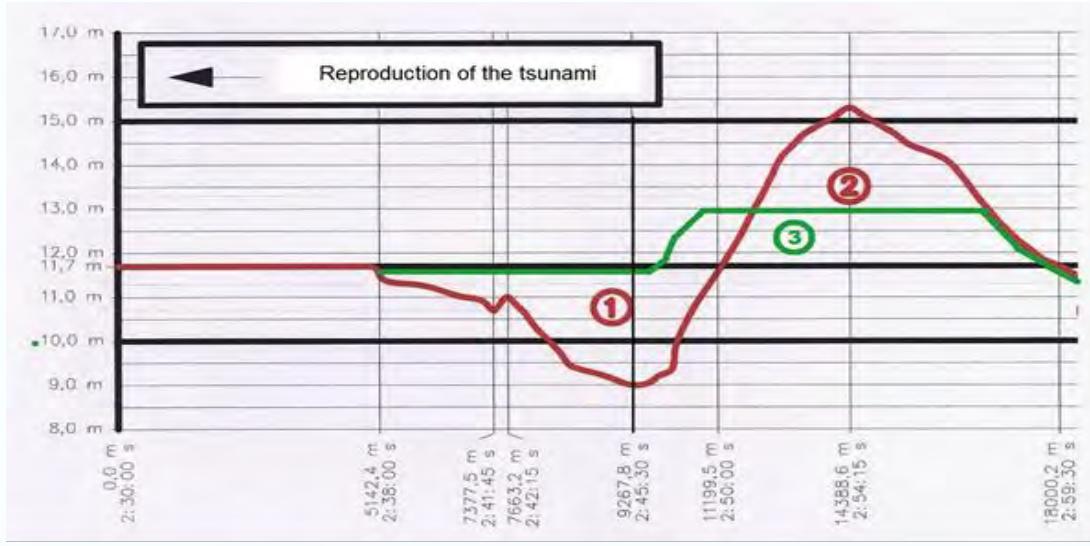
TWTB with a negative tsunami wave



TWTB with the positive tsunami wave



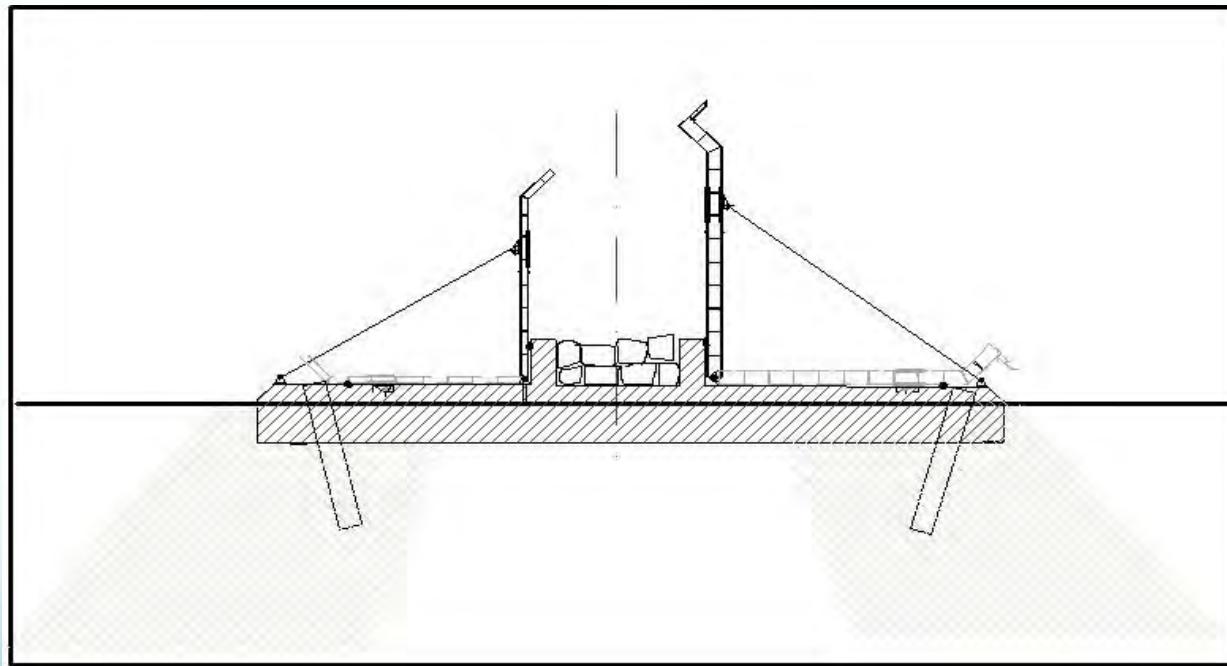
Het effect van de TWTB



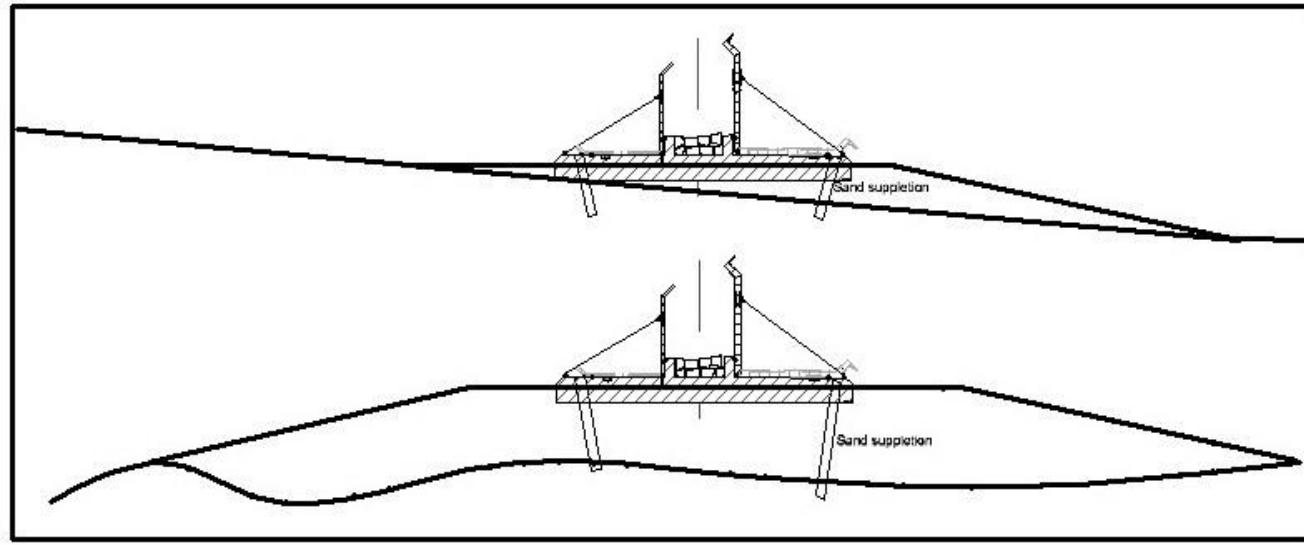
- The data illustrated in the above graph shows the situation in the water at a distance of 1500 m from the coast with a water depth of 11.7 m. Without a tsunami barrier the water depth would drop down to 9.0 m during the negative tsunami wave and would rise more than 6.2 m up to 15.2m during the positive wave (see red line). The volume of water in ① is $9210 \text{ m}^3/\text{m}$. The volume of water in ② is $13518 \text{ m}^3/\text{m}$.
- In a situation where a Twin-Wing Tsunami Barrier is installed the coastal water would be blocked and there would be little water displacement. The positive wave (green line) would rise up to a maximum of 13.0 m – an increase 1.2 m (see green line). The volume ③ of the lower positive wave is $6771 \text{ m}^3/\text{m}$ (26.5% less than without the barrier).



The definitive design of the TWTB

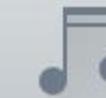
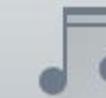
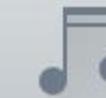


TWTB situated on a sandbank

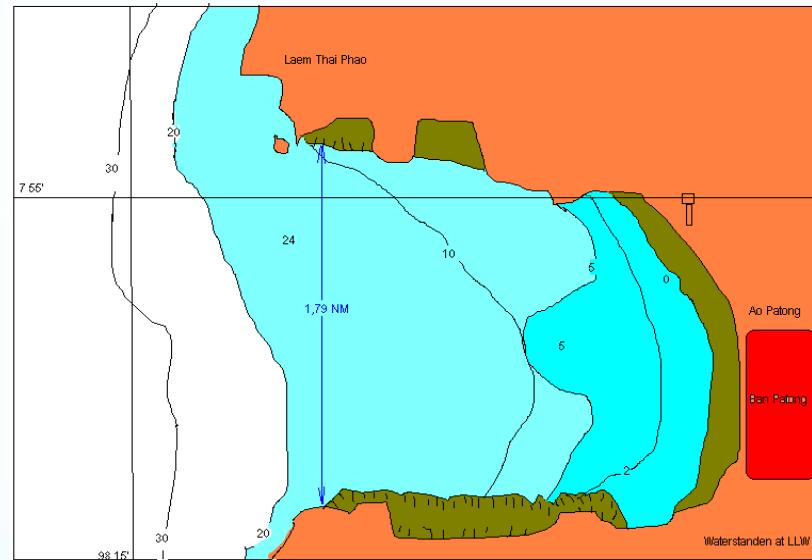


Artist impression of the TWTB

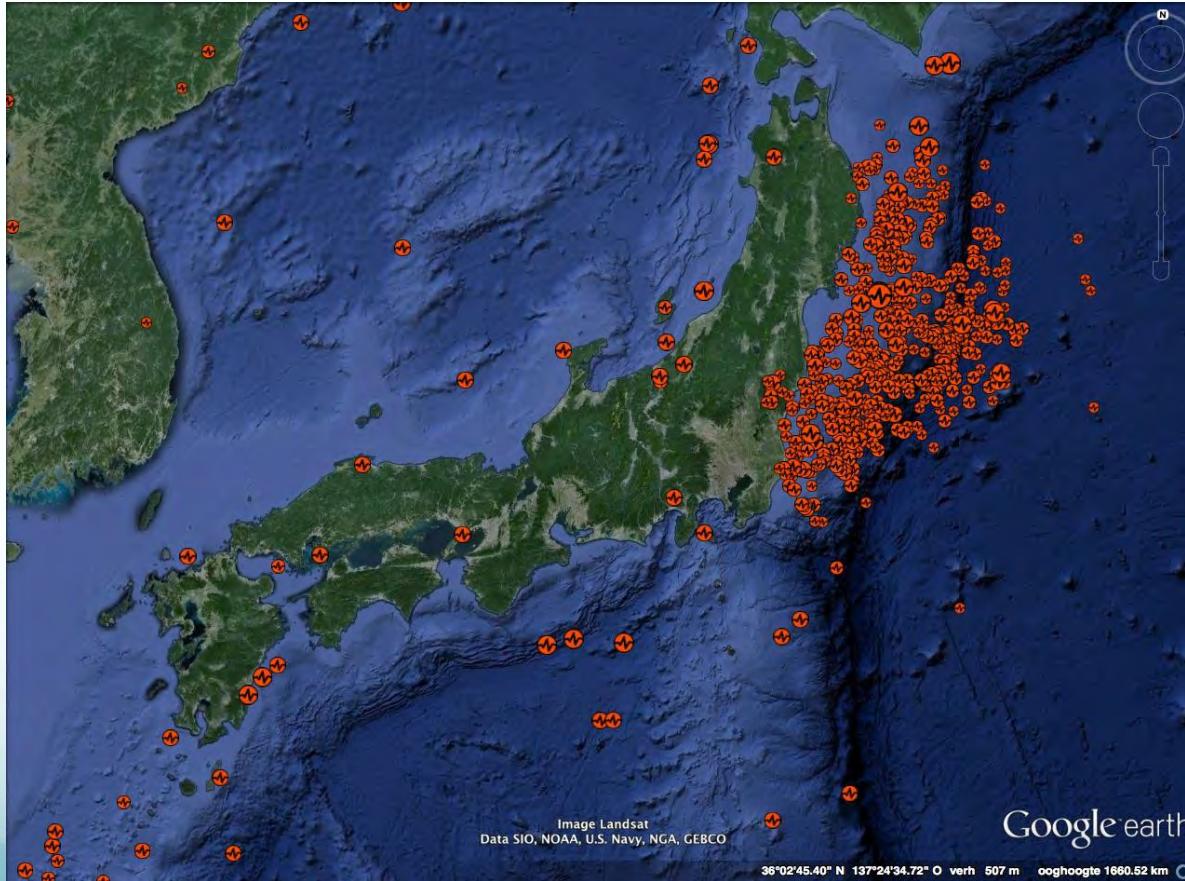




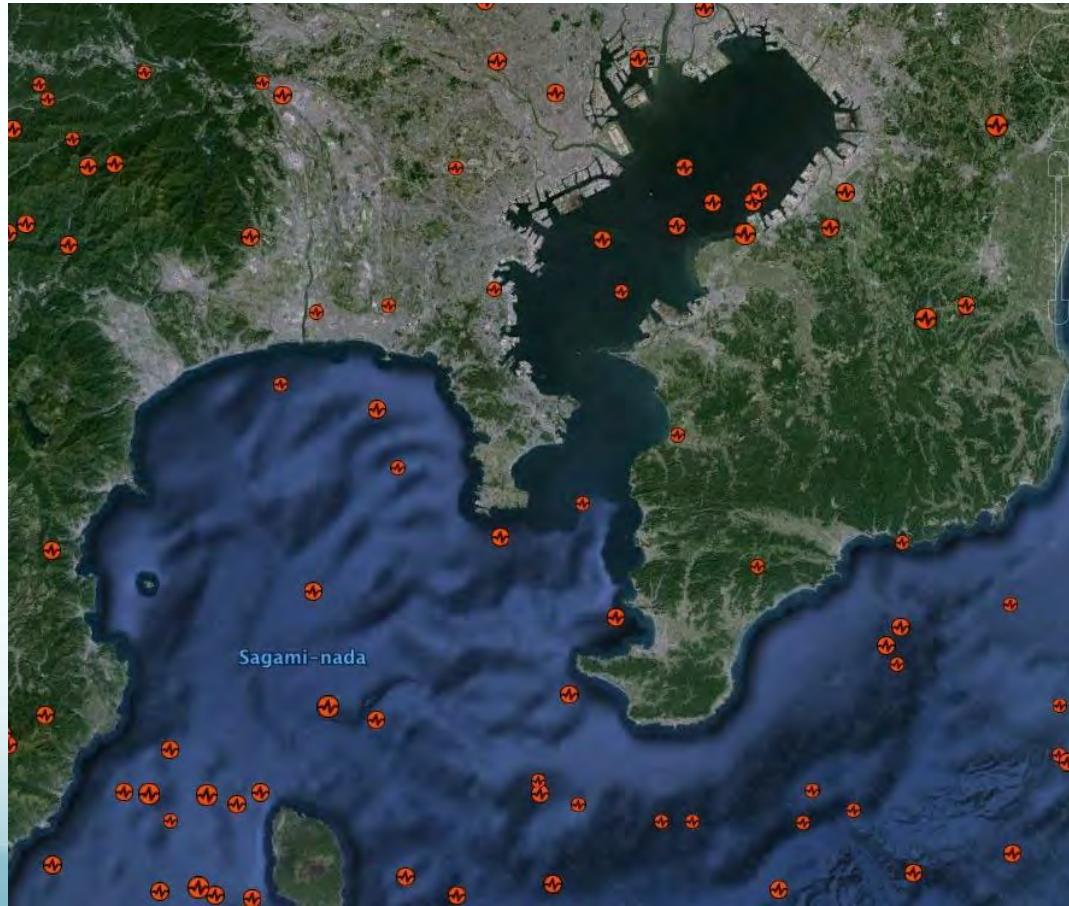
Example of protection of Phuket in Thailand



Earthquakes for the coast of Japan

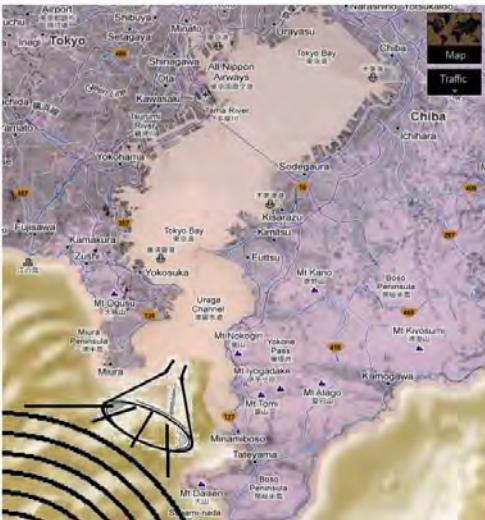


Earthquakes for the coast of Tokyo Bay



Risk of a tsunami in Tokyo Bay

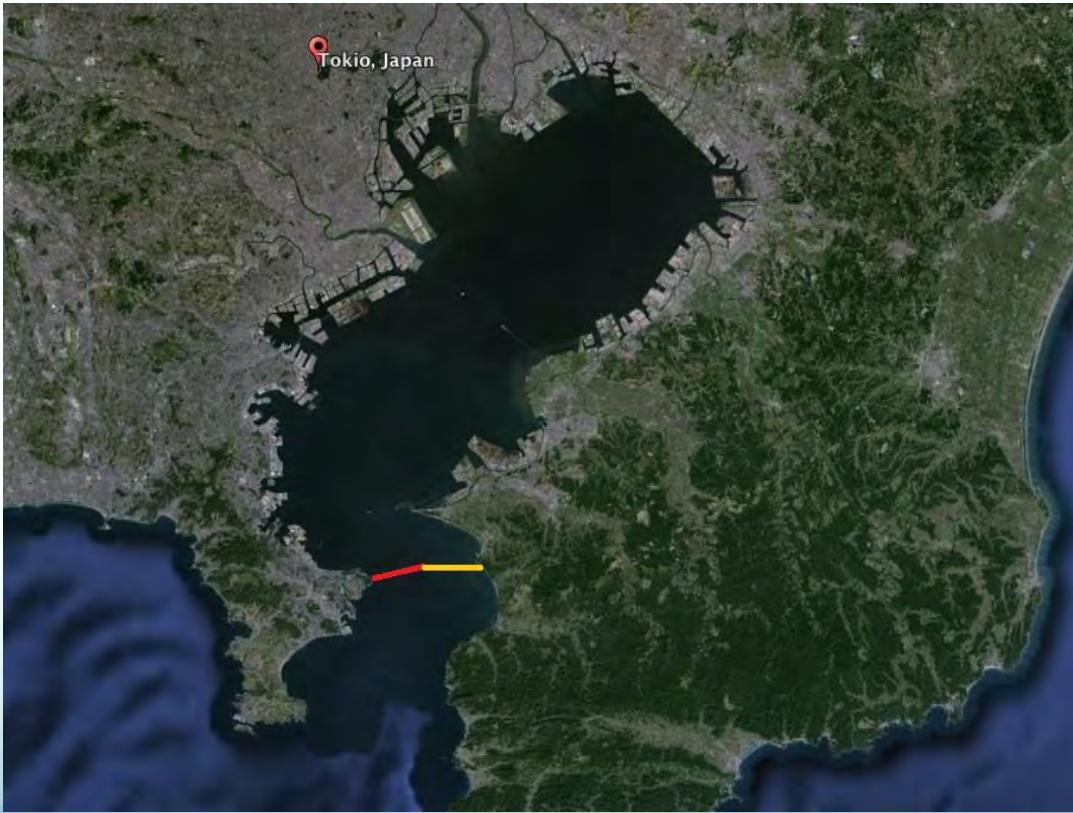
V-Shaped Mouth of Tokyo Bay Acts a Funnel
to Concentrate Seismic Energy



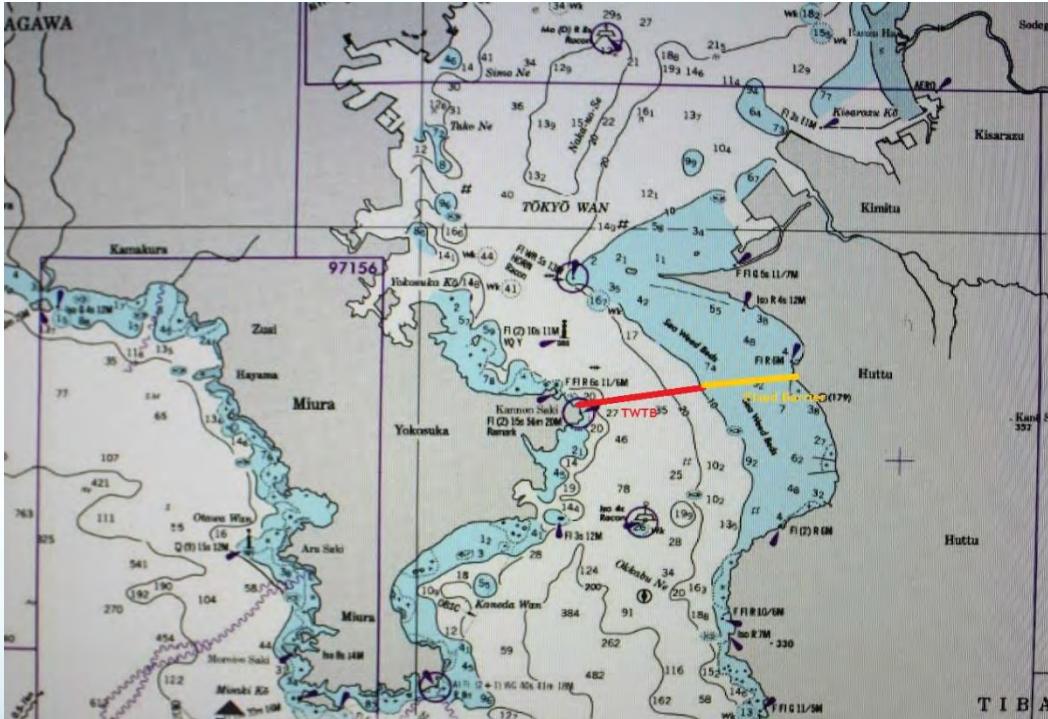
Deflection of Seismic Energy
Due to Topographic Effects



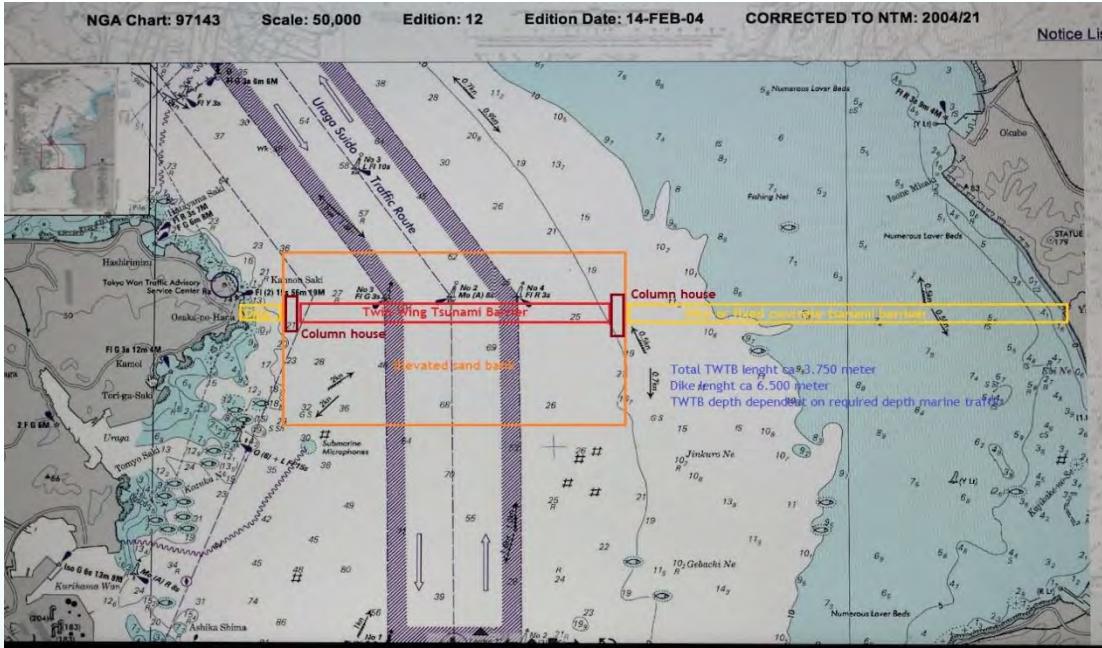
TWTB Protection for the City of Tokyo



TWTB Protection for the Tokyo Bay



TWTB Protection for the Tokyo Bay



The ideal position to protect the City of Tokyo for tsunami's is to construct the TWTB at the entrance of the Bay of Tokyo:



Wall Street Journal Award

Twin Wing Tsunami Barrier winner of the 2012

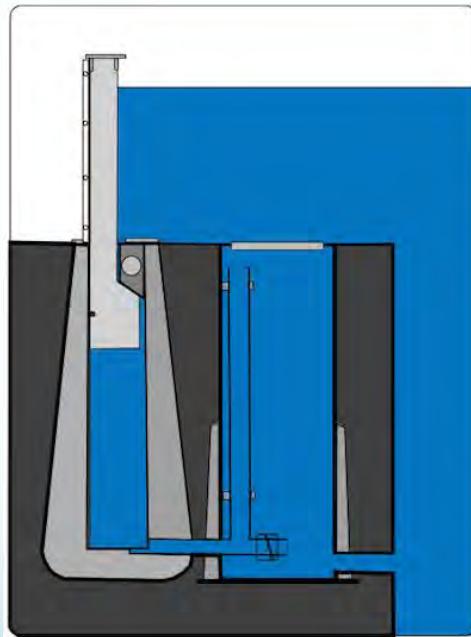


Edison award Chicago 2013



Robert Broncel, Johann van den Noort, Bas Ziekenheimer

Two innovative exportproducts from the Netherlands



“Using the power of water to keep the water where it belongs”



Stellingen van vandaag

- 1 Vergeet de strijd tegen het water, die kun je nooit winnen.
2. Probeer nooit tegen de stroom in te zwemmen dat kost te veel energie.
3. Ontwikkel je creatief naast je technische studie.
Creatieve vorming moet het belangrijkste vak worden op de Technische Universiteiten.
4. Door creatieve vorming ontwikkel je de innovatie en deze is de motor van onze economie en de belangrijkste tool voor de exportmogelijkheid van ons land.
5. Wanneer we de waterbouw als exportartikel willen behouden, zullen we veel creatiever en innovatiever moeten worden.
6. Nieuwe innovaties zullen we als eerste in onze Nederlandse waterbouw moeten toepassen.



Van den Noort Innovations bv

Engineering Inventions: focusing men....environment....future!

More information on:

www.noort-innovations.nl