

# Changing the game of flood fighting

Sigurd Melin, of Sweden's NOAQ Flood Protection AB, discusses the latest methods of fighting floods



**K**eeping flood water away from homes and companies isn't really a difficult technical challenge. We have been successfully doing this by creating temporary flood barriers through piling sandbags, since the sandbag itself (or maybe the power loom) was invented some 200 years ago.

The problem is that sandbagging is so labour intensive and inefficient that it requires a lot of bags, sand, people as well as a lot of time, which we do not always have. Therefore we have often had to choose which buildings and objects to protect, within the time available, and which ones to give up.

## NOAQ Boxwall

Swedish company NOAQ is about to change this, once and for ever. The company has invented the Boxwall, a mobile temporary flood barrier that is so light and manageable that anyone can build

their own. The Boxwall weighs not more than 7kg (15lbs) per metre, which is less than 1% of a corresponding sand bag dyke. With the single components weighing even less a private home can be protected by the family members alone. The staff of a shop or a factory is able to protect their own company and school children can protect their own school (if motivated).

This means the victims of the past are instead becoming resources for future flood events. It also means that society will instead be able to concentrate its resources to protect common property and infrastructure, like roads and railways, electric substations, hospitals etc., and to help those who cannot help themselves, like elderly and disabled.

The new NOAQ technology will not only be able to get many more people engaged in flood fighting efforts, it obviously has the potential of

changing society's approach to flood protection in general, altering the organisation and the distribution of roles. In the end we will get a society that is much more flood resilient.

## The bookend principle

But how can such a light barrier withstand the forces of the water? The answer is the bookend principle, the working principle behind the Boxwall. A simple standard bookend of folded metal is supporting the books, but the bookend is in turn stabilised by the heavy books standing on it.

The Boxwall is automatically stabilised by the weight of the flood water. The higher the water levels are rising the harder the device is pressed against the ground, and the more 'anchored' it becomes. It stands firm even when the water reaches the upper edge of the barrier.

The weight reduction compared to sandbags is staggering. A NOAQ Boxwall is not only a hundred times lighter than a sandbag dyke of corresponding height, it is also a hundred times faster to build. Two people can easily deploy some 200 metres of barrier per hour. This means another advantage; barrier construction works do not need to start much before the water arrives. You can wait and see if a barrier is actually needed. The dependence on accurate long-term forecasts is diminished.

### Availability, affordability and ability

We have identified three important prerequisites that are essential to make this vision come true, the three As: availability; affordability; and ability.

First of all the devices need to be available, so nearby. Although boxes can be transported very easily, there needs to be a network of depots where people can borrow or rent the barrier components they need. Being a mobile barrier, the NOAQ Boxwall can also be transported in huge quantities to areas threatened by flooding from depots in other regions. A standard 20 foot container can take more than 500 metres of Boxwall.

A renting model may also address the second prerequisite; affordability. This makes it possible for people to pay for the protection only when they need it, avoiding the much higher costs of damaged property. Buying the device is still an option, as the total costs are not higher than for sandbags, but the Boxwall is also reusable.

However, the most important prerequisite is probably ability, i.e. citizens' ability to manage the situation on their own, using the new technology. We must make people realise that they are no longer helpless victims in need of someone to come and save them. Most of them are now able to save themselves, and this must

of course be the most important task for the government – information.

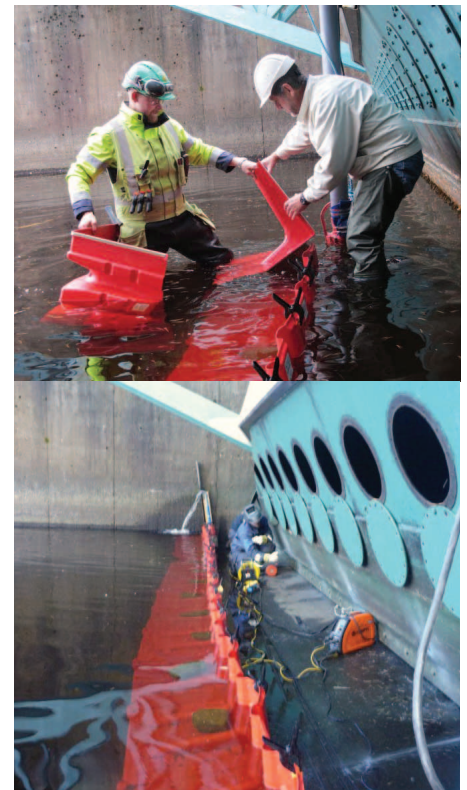
### Further opportunities

Temporary barriers in general, and the NOAQ products in particular, create other opportunities, for instance in urban planning. They open up the possibility to lower permanent embankments along rivers and lakes. Dimensioned for a 100-year flood event, i.e. the worst flood that would occur on average once in a 100-year period, they will be oversized during the other 99 years. But few people want to live behind high embankments or concrete walls, cutting them off from the river. Temporary barriers give the planners an opportunity to reduce the height of the permanent barriers and instead prepare for raising them when needed.

Roads are another example. Keeping vital roads open during a flood is of course very important, both for transport that are needed to cope with the catastrophe itself but also for the normal traffic that is needed to maintain society's everyday functions. By implementing the NOAQ Boxwall along each side of the road, it is relatively easy to keep the route dry and therefore allow safe passage through an otherwise flooded and inaccessible environment.

The NOAQ Boxwall has also turned out to be a very efficient tool in flash flooding, and a video showing a flash flood test (view video here) has spread virally during the last year. It has to date been viewed in different versions more than 35 million times.

By putting the Boxwall boxes directly in the flowing water, the current can be directed to where you want to have the water, or rather away from where you do not want to have it. Hereby the city streets can quickly be converted to drainage channels leading the water through the city and out of it. The next step is to make up a plan for such an action, enabling a controlled operation.



### The environmental aspect

Finally, floods are also environmental disasters. From inundated wastewater treatment plants, chemical industries, landfills etc. pollutants can be spread far and wide by flood waters. By using the NOAQ temporary flood barriers this can be avoided in two ways: they can keep the flood water from reaching such objects; and they can stop already contaminated flood water from reaching areas that are still unharmed.

There is also an environmental aspect on the flood fighting action itself. Sandbags need to be disposed of afterwards as they have become contaminated. And after the flood there are no hordes of volunteers prepared to carry away the bags. Instead heavy machines have to do the job, leaving behind them broken lawns that need to be restored. After the use of a NOAQ barrier you just pick up the components in a wheelbarrow and leave the ground to dry.

Still, the most important thing is to stop the water, and to succeed you need to be faster than the water itself. With the NOAQ barriers, you are.



## NOAQ

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