

NOAQ CEO Sigurd Melin at InterFLOOD Asia 28 March 2019:

Changing the game of flood fighting

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

The problem is that sandbagging is so labor intensive and inefficient. It requires many bags, much sand, many people, and much 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.

However, with the recent development of new light-weight free-standing self-anchoring barriers this is now about to change, once and for ever. Not only will many of the problems of the sandbag era come to an end, the new technology has in fact the potential to cause a major shift in society's overall response to flooding.

The boxwall from Swedish company NOAQ is one of these new flood barriers. The boxwall weighs not more than 7 kg per meter. This is less than 1% of a corresponding sandbag dike. Still the barrier is 100% stable. 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 the school children can save their own school. Engaging the victims of the past to instead become resources for the future means that many more hands will be available for the flood fighting efforts.

This 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.

This new technology will not only allow many more people to be engaged in the flood fighting efforts, it obviously has the potential of changing society's approach to flood protection in general, altering the organization and the distribution of roles. The new temporary flood barrier technology will become a real game changer. In the end we will get a world that is much more flood resilient.

But hold on, how can such a light freestanding barrier withstand the forces of the water? The answer is what we call the "bookend principle", the working principle behind some of the new products, including the box-wall. A simple standard bookend of folded metal is of course supporting the books, but the bookend is in turn stabilized by the heavy books standing on it.

Accordingly the freestanding flood barrier becomes automatically stabilized by the own weight of the flood water ballasting it. The higher the water rises the harder will the device be pressed against the ground, and the more reliable is it anchored. It stands firm even when the waters reach the upper edge of the barrier.

The weight reduction compared to the sandbags is staggering. A modern freestanding flood barrier built on the bookend principle is not only a hundred times lighter than a sandbag dike of corresponding height, it is also a hundred times faster to build. Two people can easily deploy some 200 meters of barrier per hour.

This means another advantage. Barrier construction works do not need to be started long before the water arrives. You can wait and see if actually a barrier is needed. Hereby the dependence on accurate long term forecasts is diminished.

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

First of all the device need to be available, not too far away. Although the light barrier components can be transported very easily, there need to be a network of depots where people can borrow or rent the barrier components they need. Now, as the mobile barriers are in fact mobile they can be transported in huge quantities to areas threatened by flooding from depots in other regions. For example, a standard 20' container can take more than 500 meters of boxwall.

A renting model may also address the second prerequisite, affordability. A such model makes it possible for people to pay for the protection only when they need it, avoiding the much higher costs of damaged property. However, buying the device is still an option, as the total costs are not higher than for the sandbags, taking into account the necessary extra costs for labor and transportation of sand. To the site as well as from the site, afterwards.

The most important prerequisite is probably ability, i.e. the citizens ability to manage the situation on their own, using the new technology. We must make people realize that they are no longer helpless victims in need for 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, making ordinary people aware of their own ability to save themselves, by using the new tools.

Temporary barriers in general, and the NOAQ products in particular, also 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 years 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 or the sea. Temporary barriers give the planners an opportunity to reduce the height of the permanent barriers and instead prepare for adding some extra height when needed.

Another example is roads. Keeping vital roads open during a flood is of course very important, both for transports that are needed for coping with the catastrophe itself, but also for the normal traffic that is needed to maintain society's everyday functions. By putting a temporary flood barrier along each roadside, and a pump in between, it is relatively easy to keep a road open that otherwise had become submerged and closed.

Some mobile flood barriers have also turned out to be very efficient tools in flash flooding, and a video showing a flash flood test with a boxwall has spread virally on the Internet during the last year. This one has to date been viewed more than 55 million times. The video shows the individual boxwall boxes being placed directly in the flowing water, redirecting the current. This way the water can be directed away from where you do not want to have it. Hereby 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.

Finally, floods are also environmental disasters. From inundated wastewater treatment plants, chemical industries, landfills etc pollutions are spread far away by the flood water. By using temporary flood barriers this can be avoided, in two ways. They can keep the flood water from reaching such objects, but it can also stop already contaminated flood water from reaching areas that are still unharmed.

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

However, most important is still to stop the water, and to succeed you need to be faster than the water itself. This has now been made possible, using the new technology, the new temporary flood barriers.

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