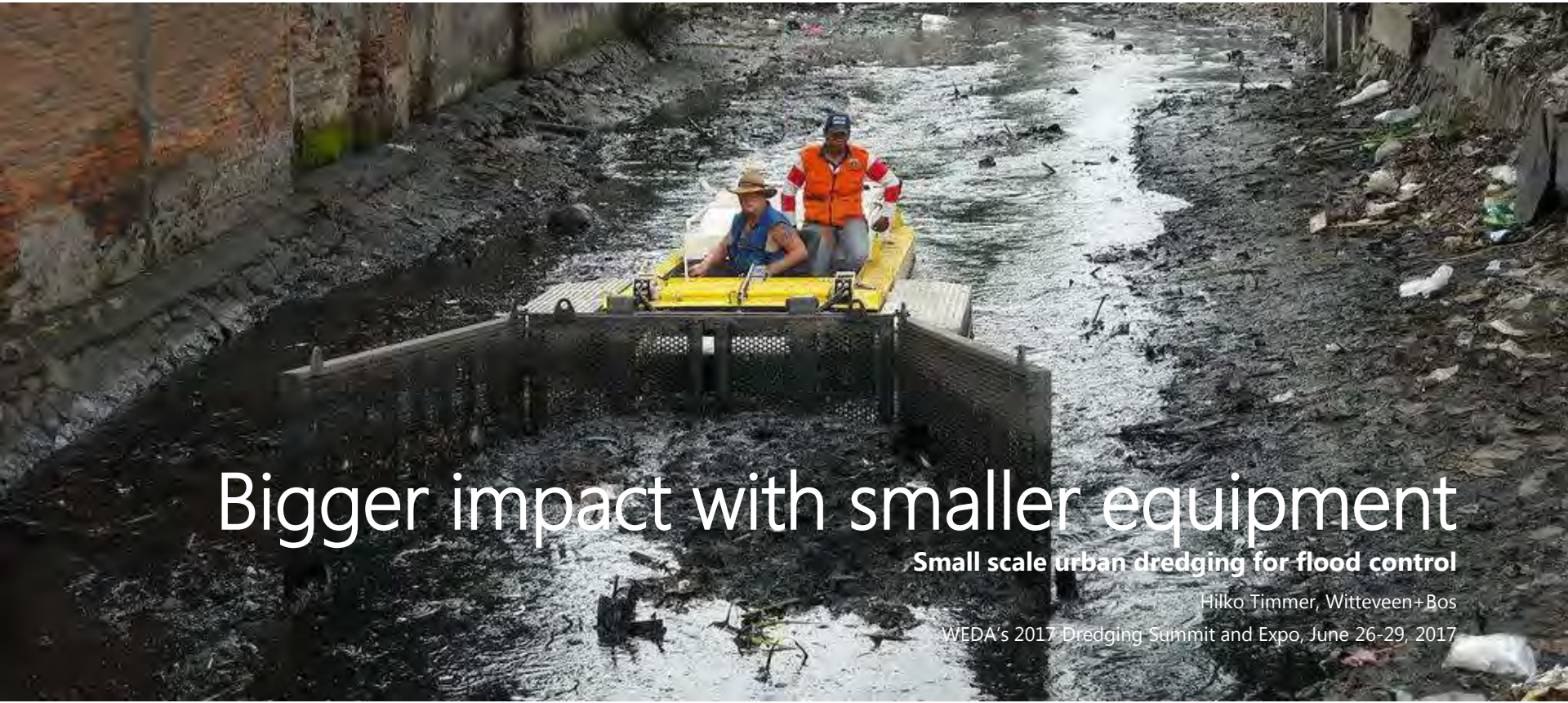


Bigger impact with smaller equipment

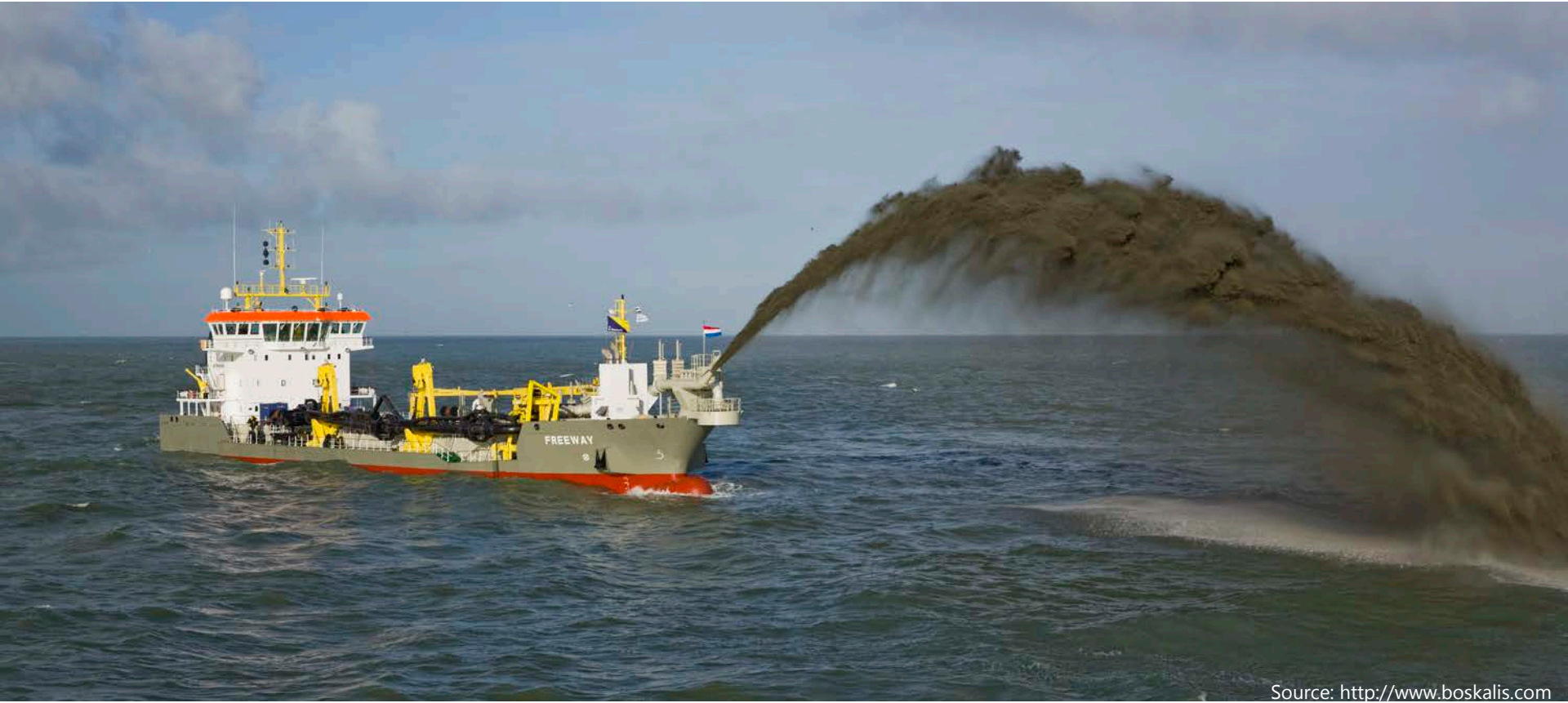
Small scale urban dredging for flood control

Hilko Timmer, Witteveen+Bos

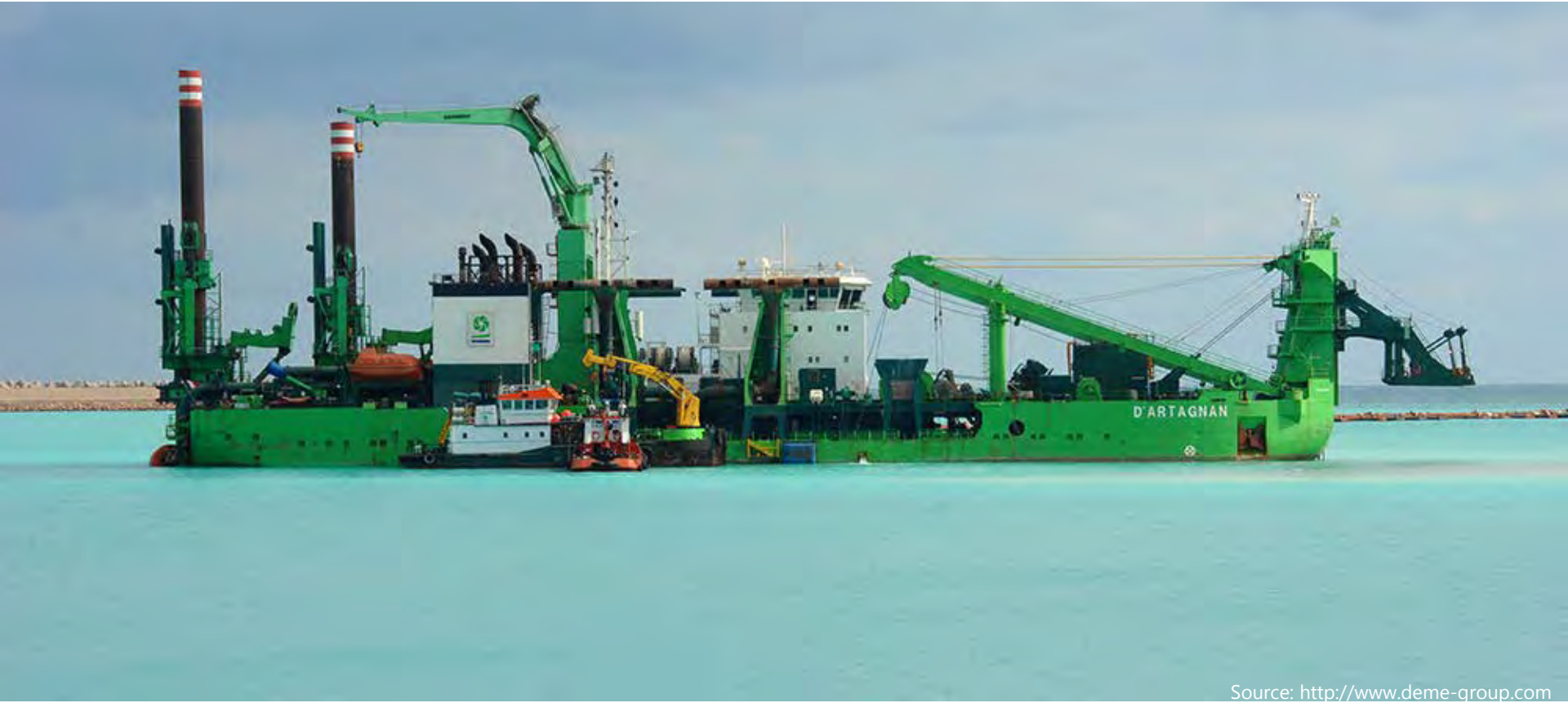
WEDA's 2017 Dredging Summit and Expo, June 26-29, 2017

Source: http://www.vanoord.com

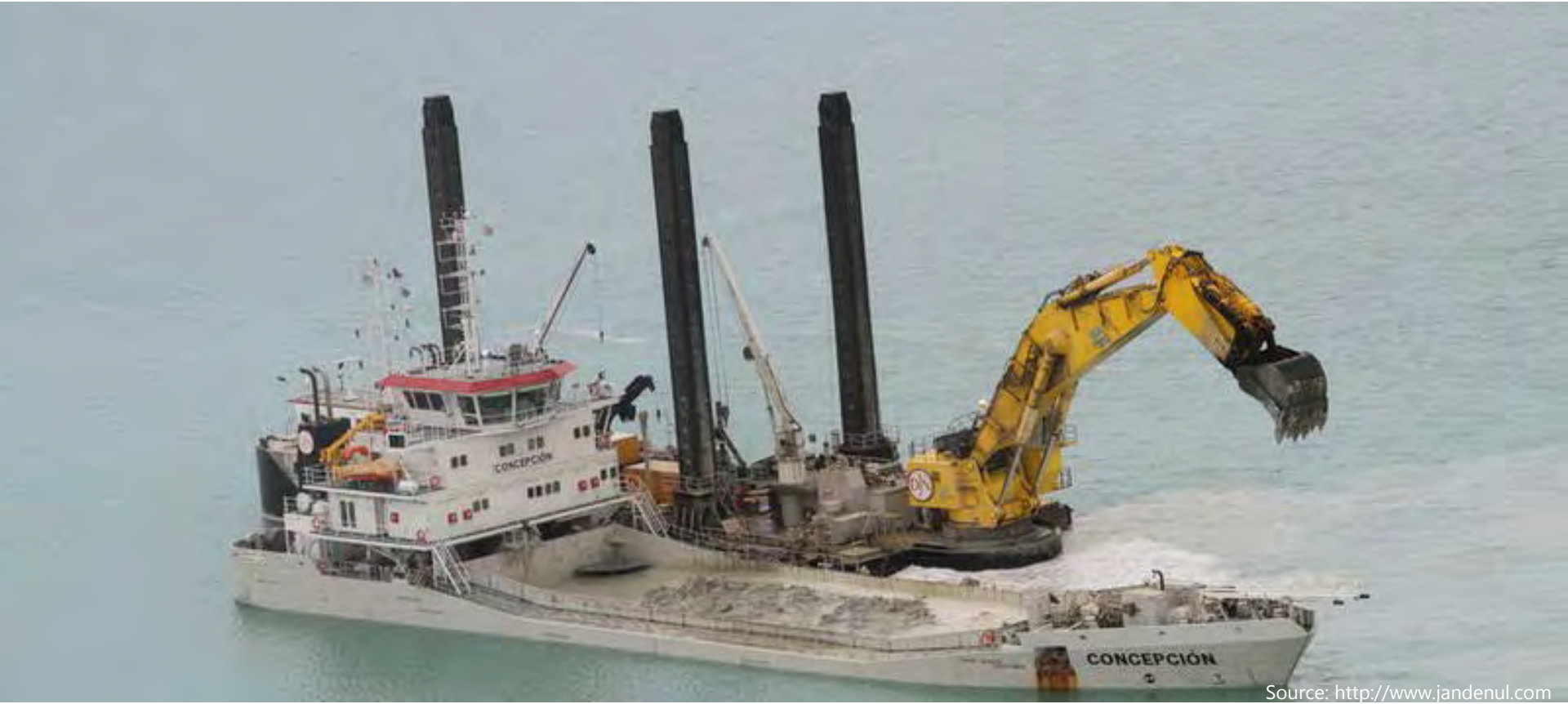
Source: http://www. qldd.com



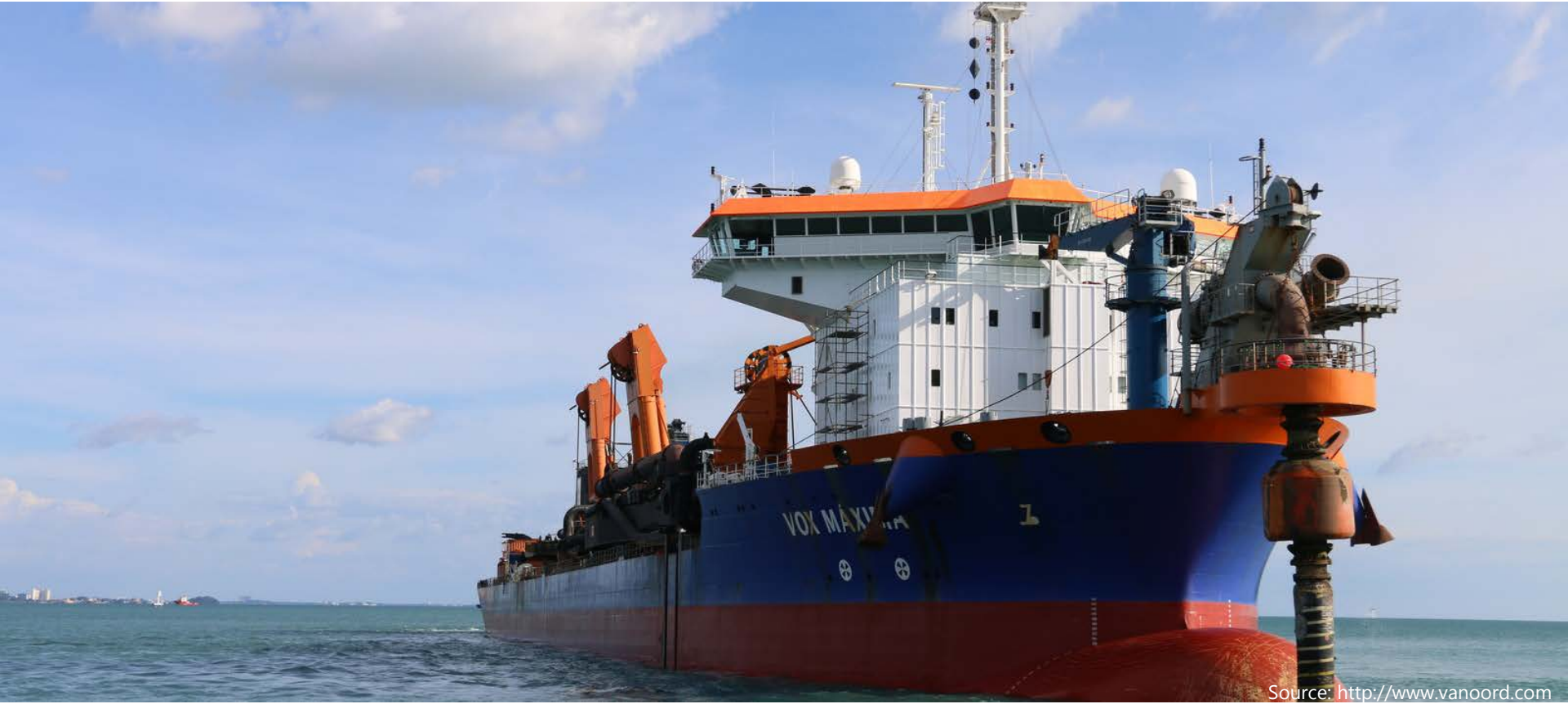
Source: http://www.boskalis.com



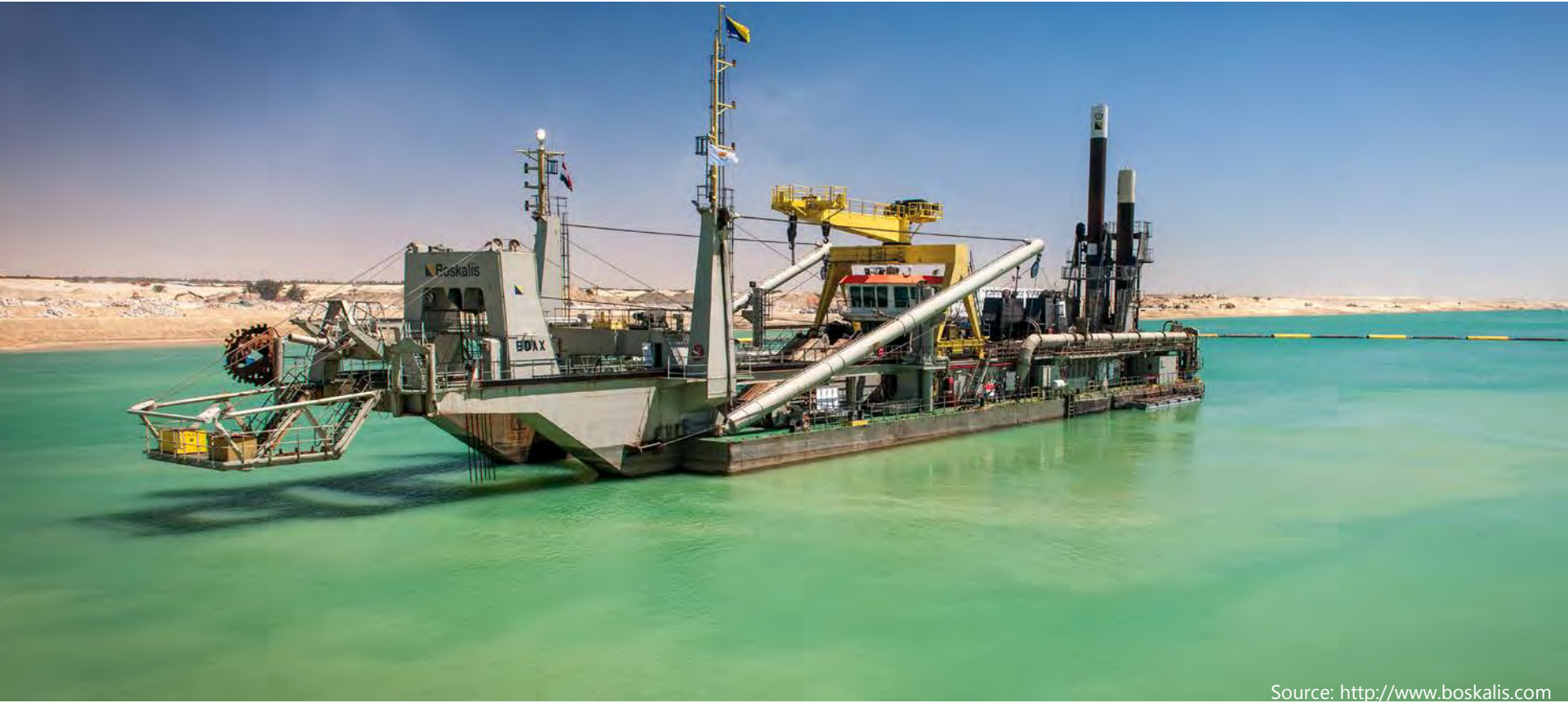
Source: http://www.deme-group.com



Source: http://www.jandenul.com



Source: http://www.vanoord.com



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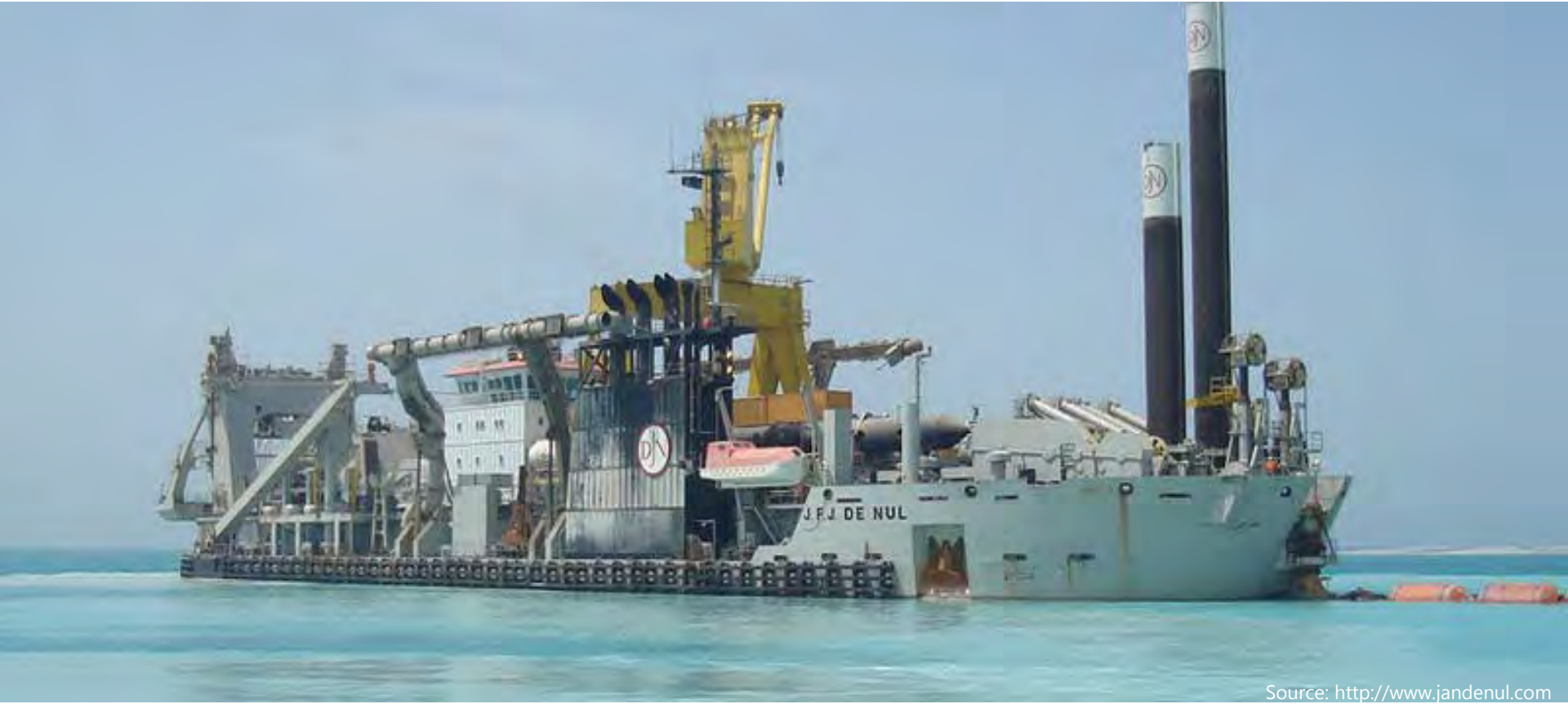

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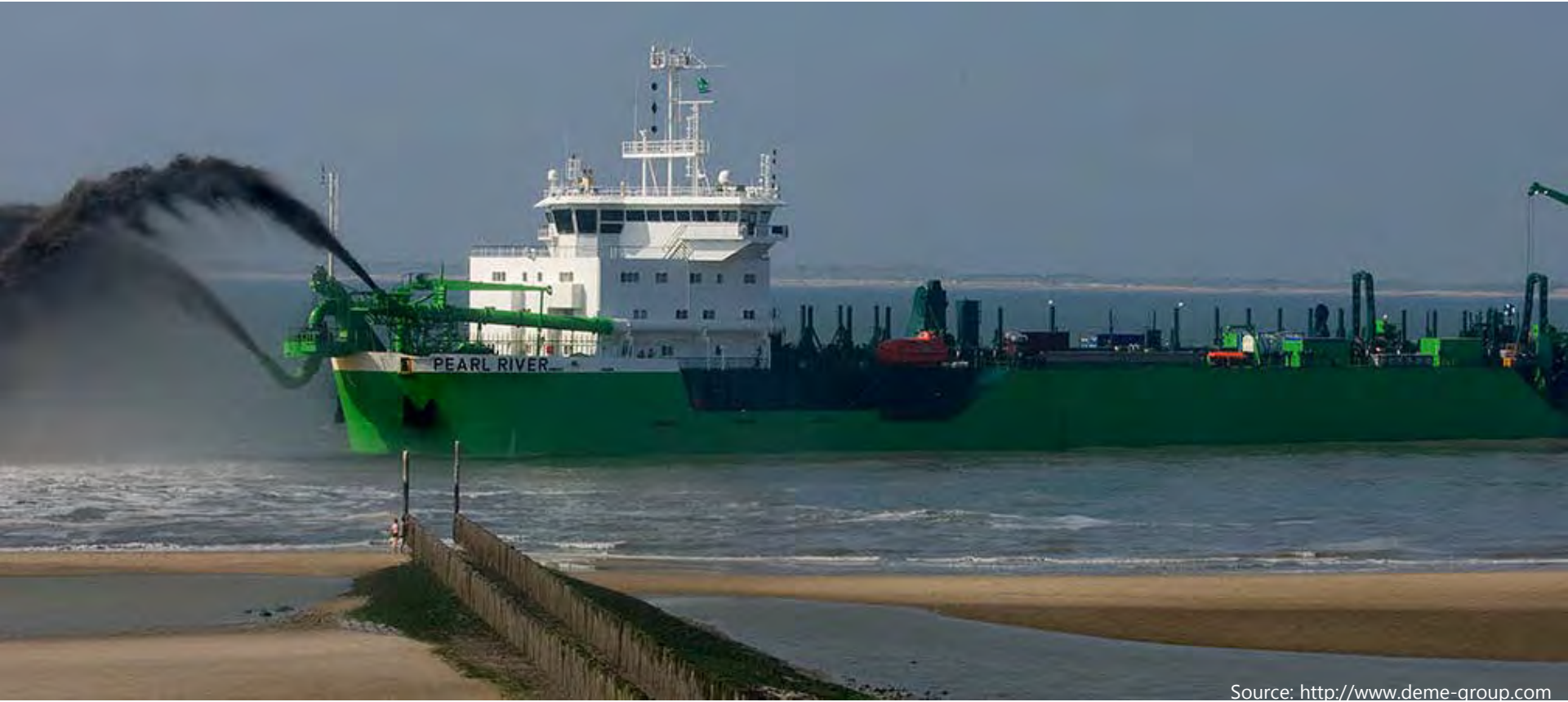

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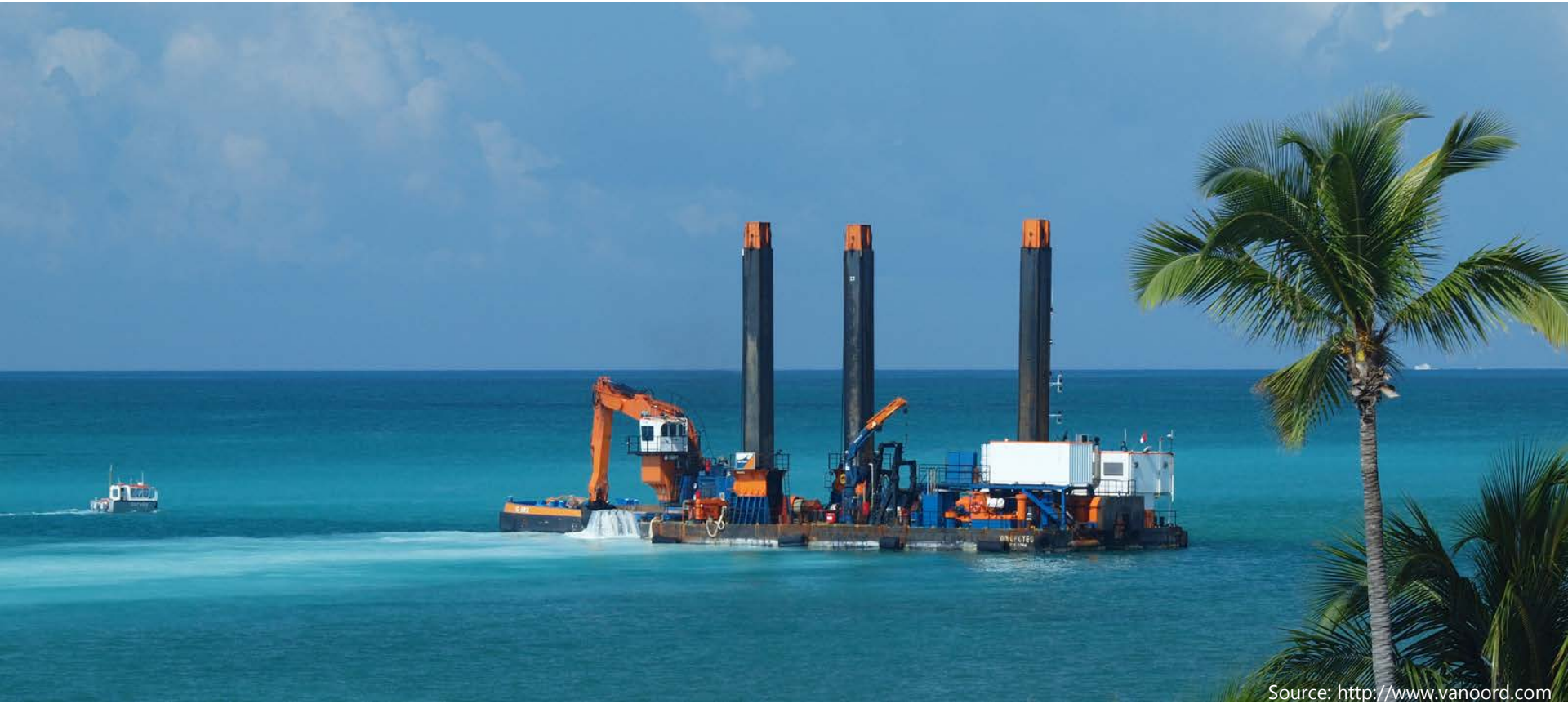
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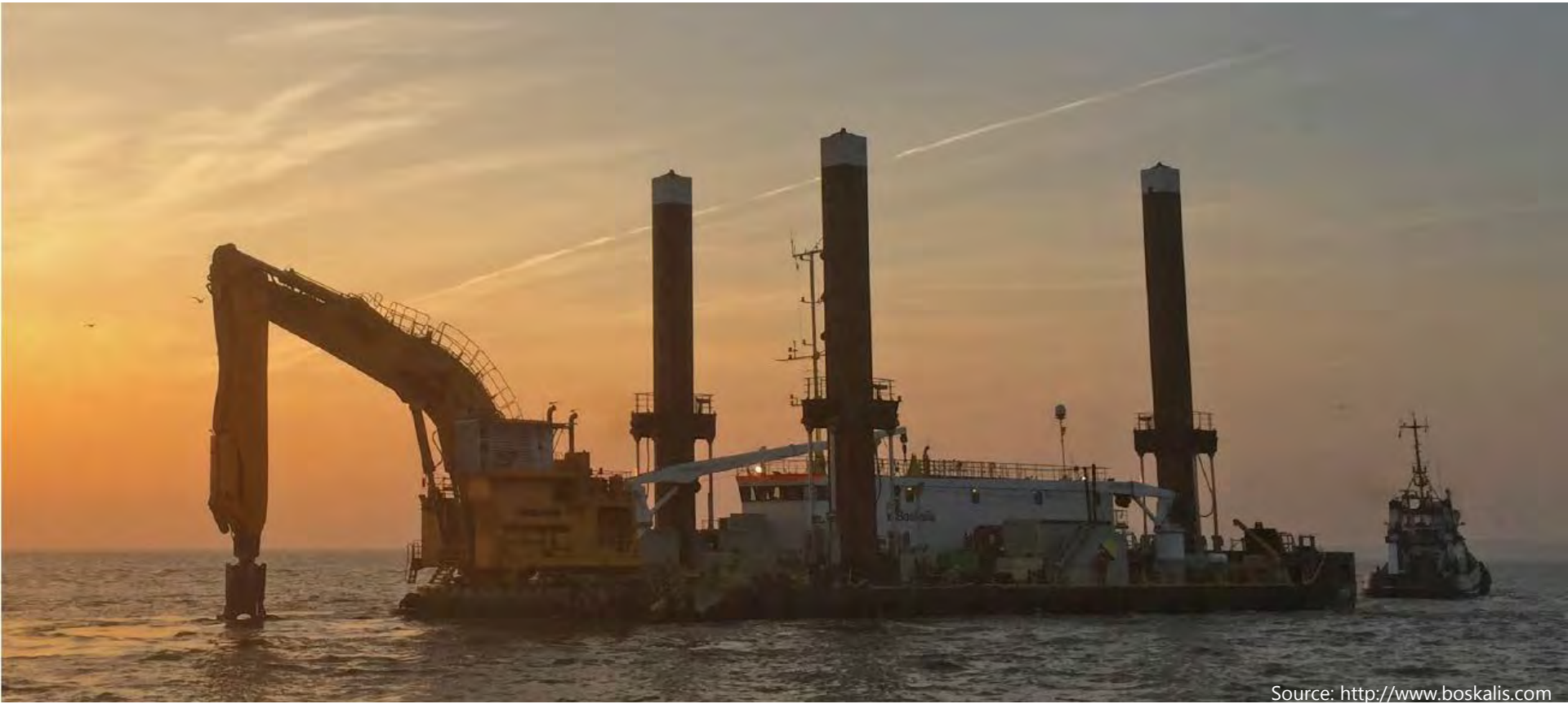
Source: http://www.jandenul.com



Source: http://www.boskalis.com

Source: http://www. qldd.com

Impressive dredgers, isn’t it?

But not so practical when it comes to urban dredging!

Dredging for flood control

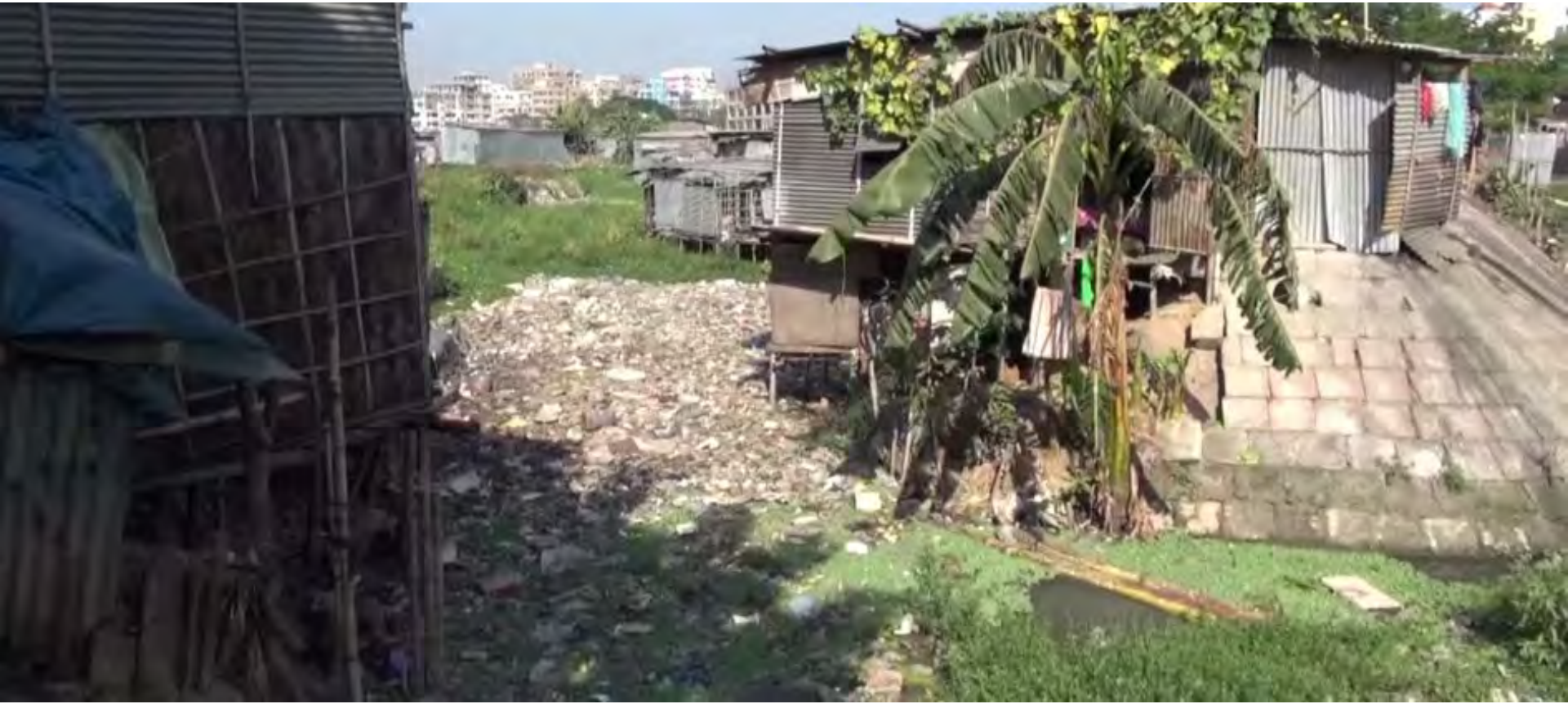
(to ensure the conditions for a better living environment)

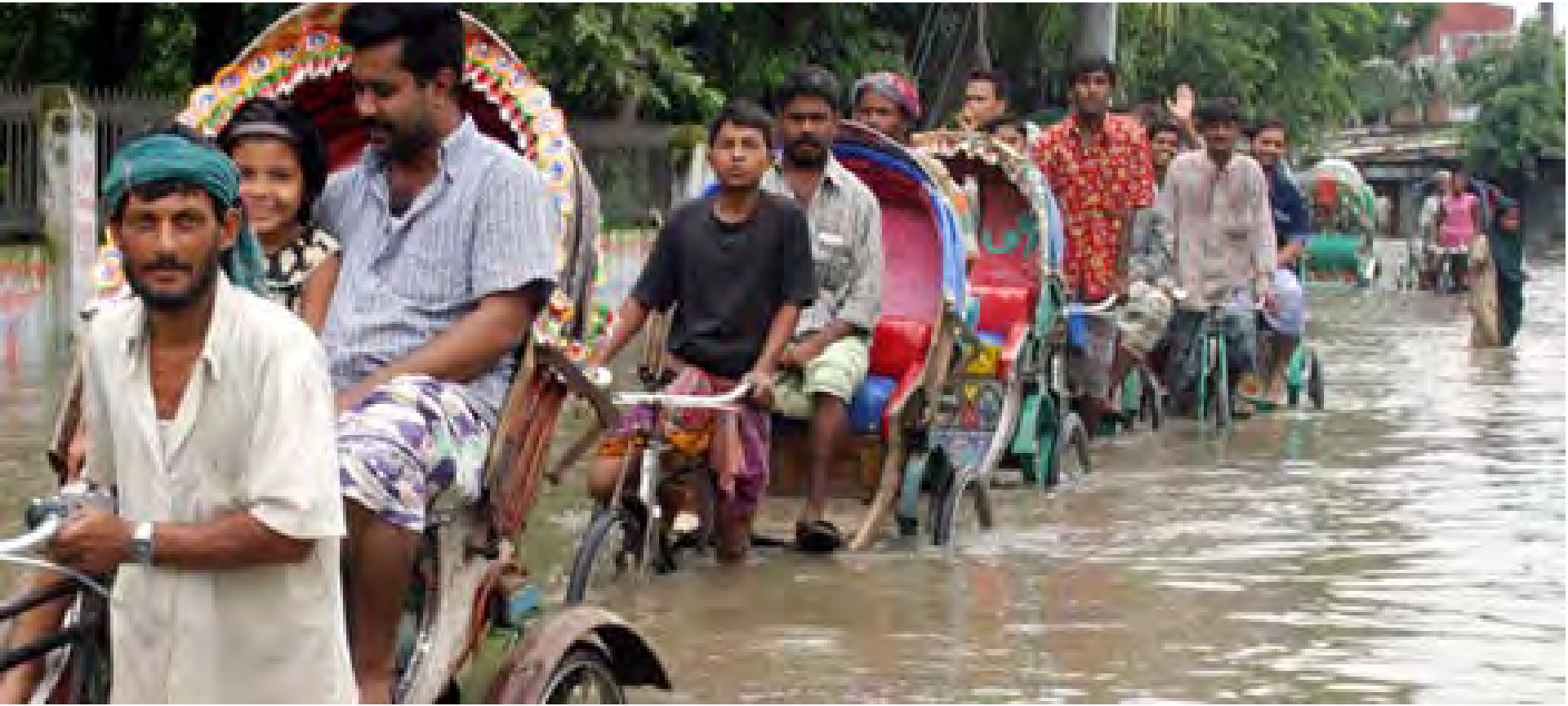
- A brief introduction to (soft) engineering
- Small scale dredging equipment excels
- Successful implementation
- Conclusions

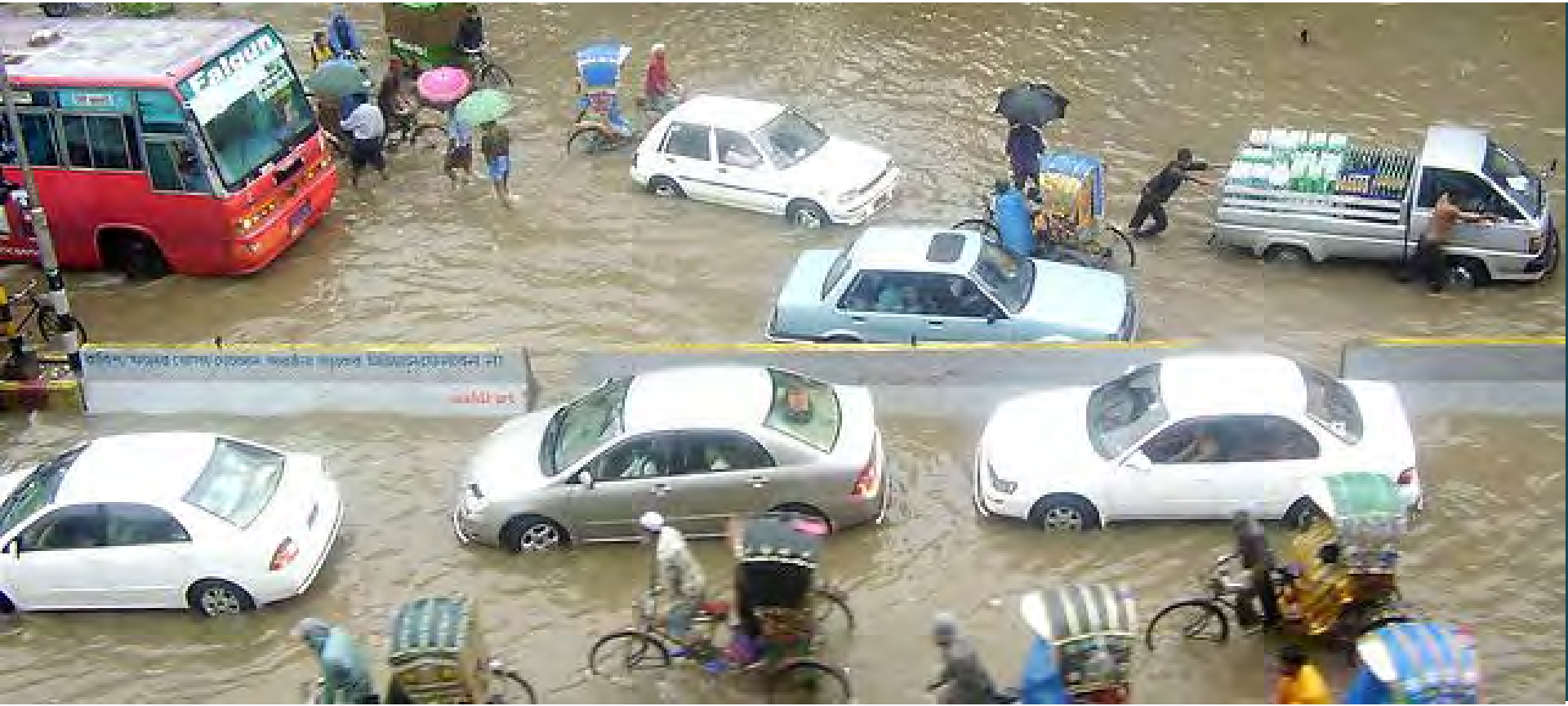
A brief introduction to (soft) engineering

(to make it sustainable)

- Community participation and public awareness
- Cost-Benefit Analysis of urban maintenance dredging
- Commitment and funding
- Training on the job
- Maintenance dredging is a project by itself



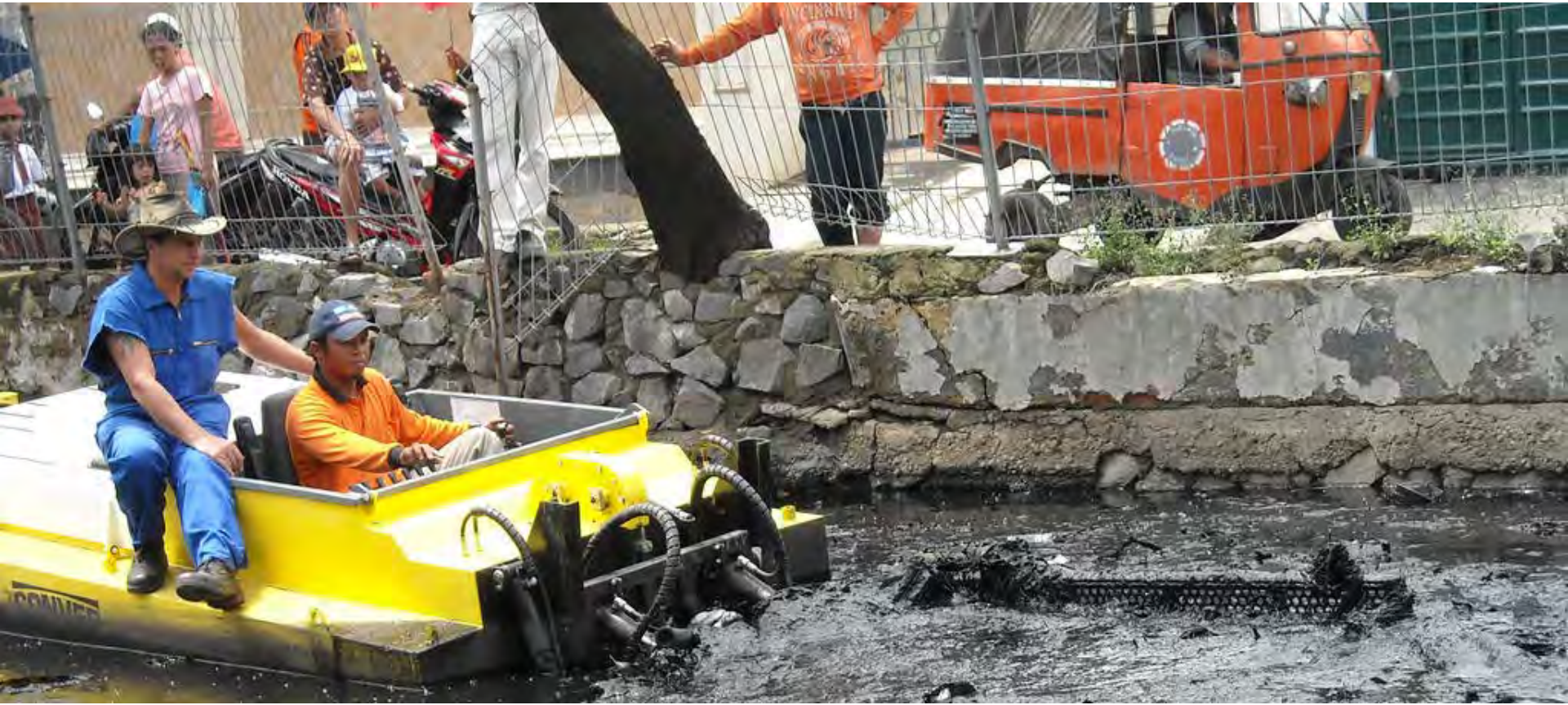




- Community participation can be loosely defined as involving the people of the community in a project in order for them to help solve their own problems.

- Raising public awareness is not the same as telling the public what to do – it is explaining issues and disseminating knowledge to people so that they can make their own informed decisions.

Witteveen + Bos



Witteveen + Bos

Witteveen + Bos

USAID
FROM THE AMERICAN PEOPLE

IDB
Inter-American Development Bank

NWP
NETHERLANDS WATER PARTNERSHIP

THE WORLD BANK

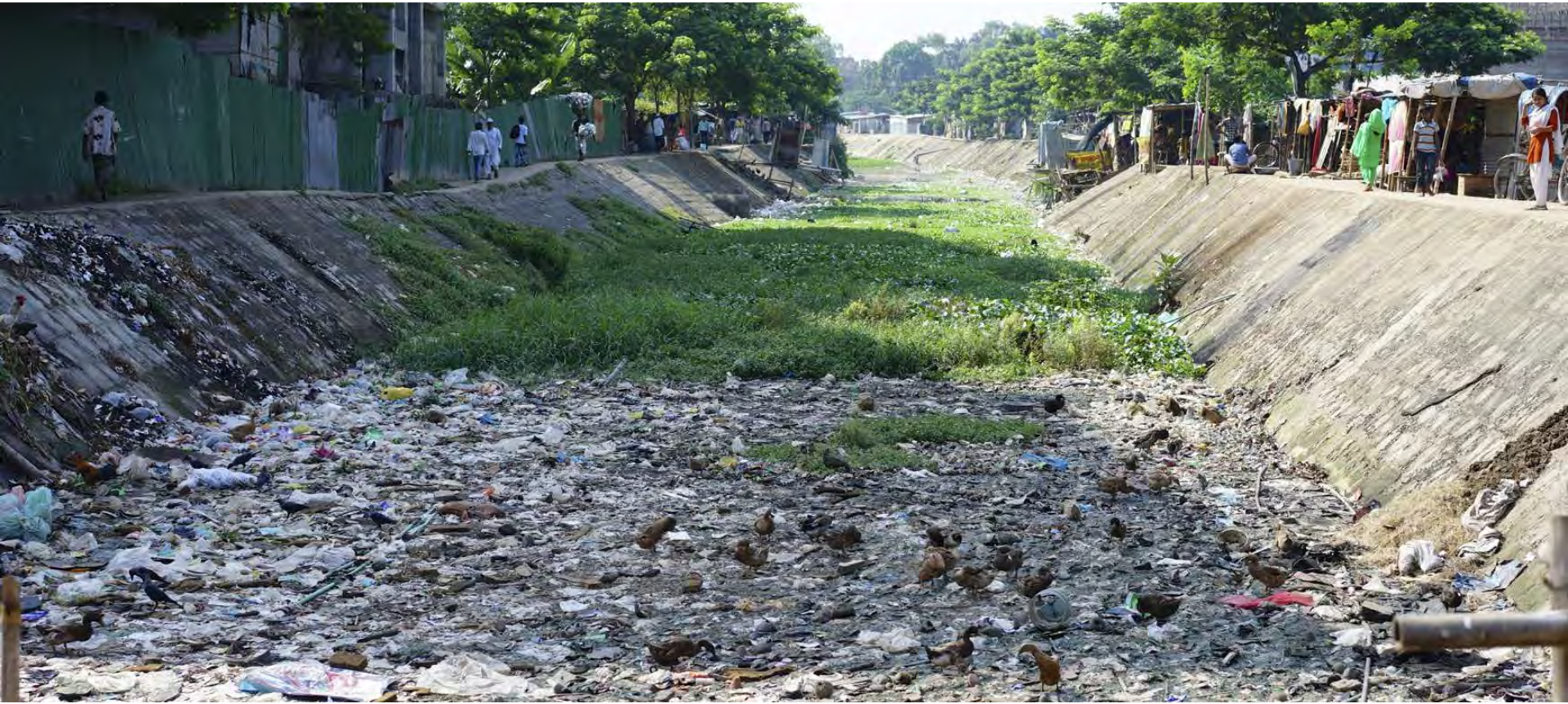
UNDP

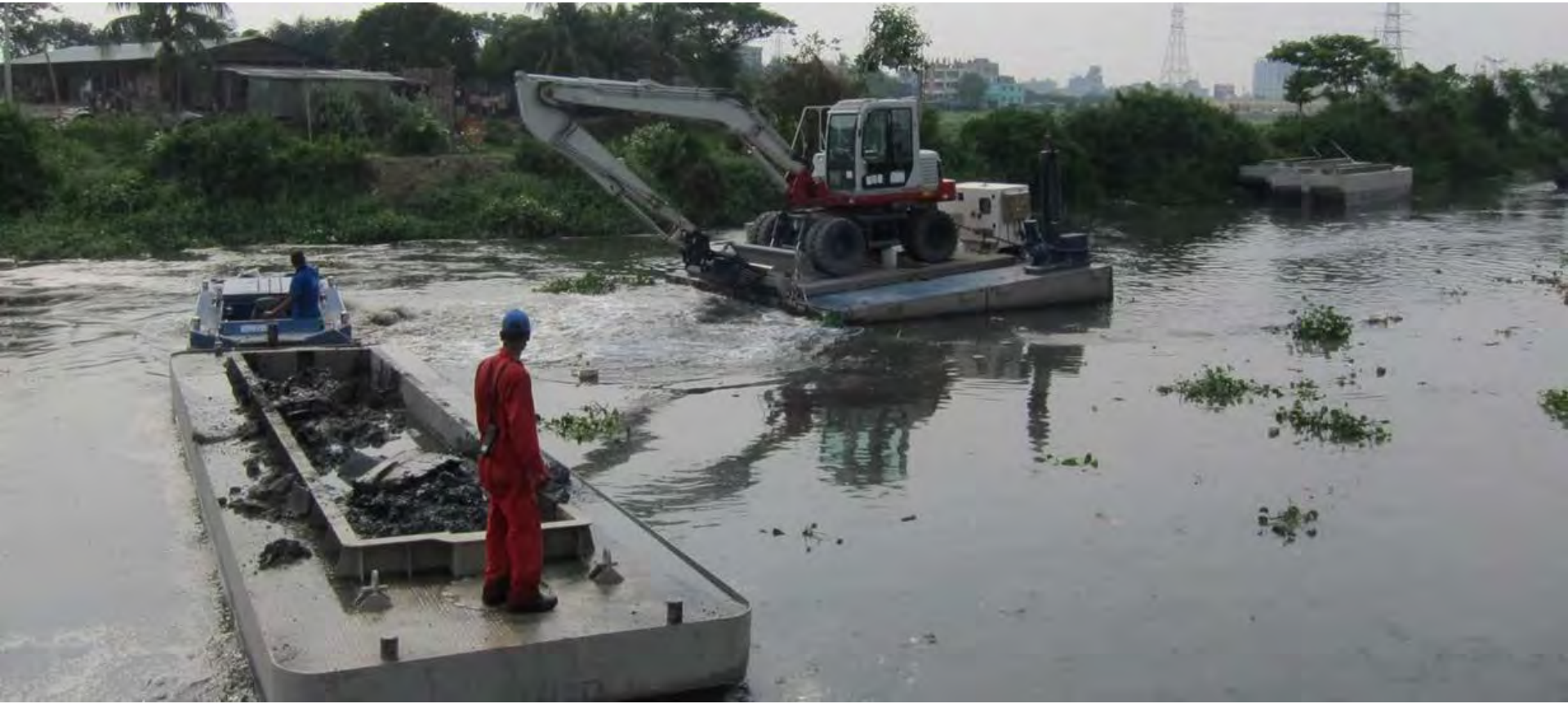
Maintenance dredging is a project by itself

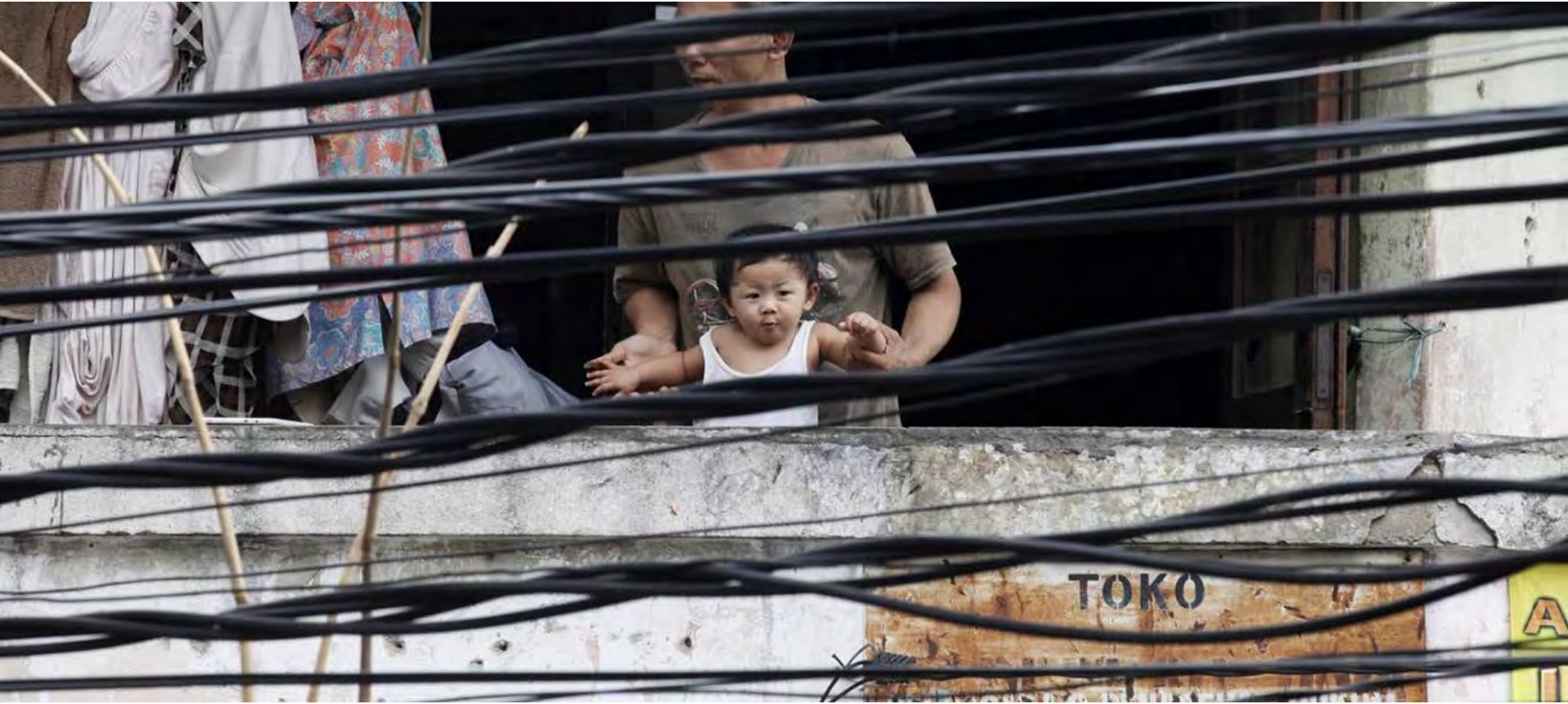
- Understanding of the catchment area and storm water drainage
- Preparation of the dredging plan
  - The type of drains (e.g. open channel or closed box culvert).
  - Suitable disposal areas (objections from proposed quarter, highly congested traffic).
  - Structures on the embankment (some may be illegally constructed).
  - Cables and pipelines near, above and in the drains.
  - Truck and excavator stands and robust connection points for the floating bulldozer.
  - Bottlenecks in the storm water drainage system (e.g. possibilities to lower the water table temporary to create additional height under bridges or in closed box culverts).

The floating bulldozer excels

- Large quantity of solid waste (exclusion of hydraulic dredgers).
- Operations in built-up areas (exclusion of hydraulic transport by pipelines).
- Obstacles above, near and in the waterway (exclusion of excavator on pontoon; possible height of hull of floating bulldozer only 0.75 m).
- Limited width and depth of waterway (exclusion use of a pontoon; possible draft and width of floating bulldozer only 0.45 m and 1.00 m).
- Closed box culverts may be part of drainage system (exclusion of all common dredging equipment; floating bulldozer may be remotely operated and ATEX-proof).



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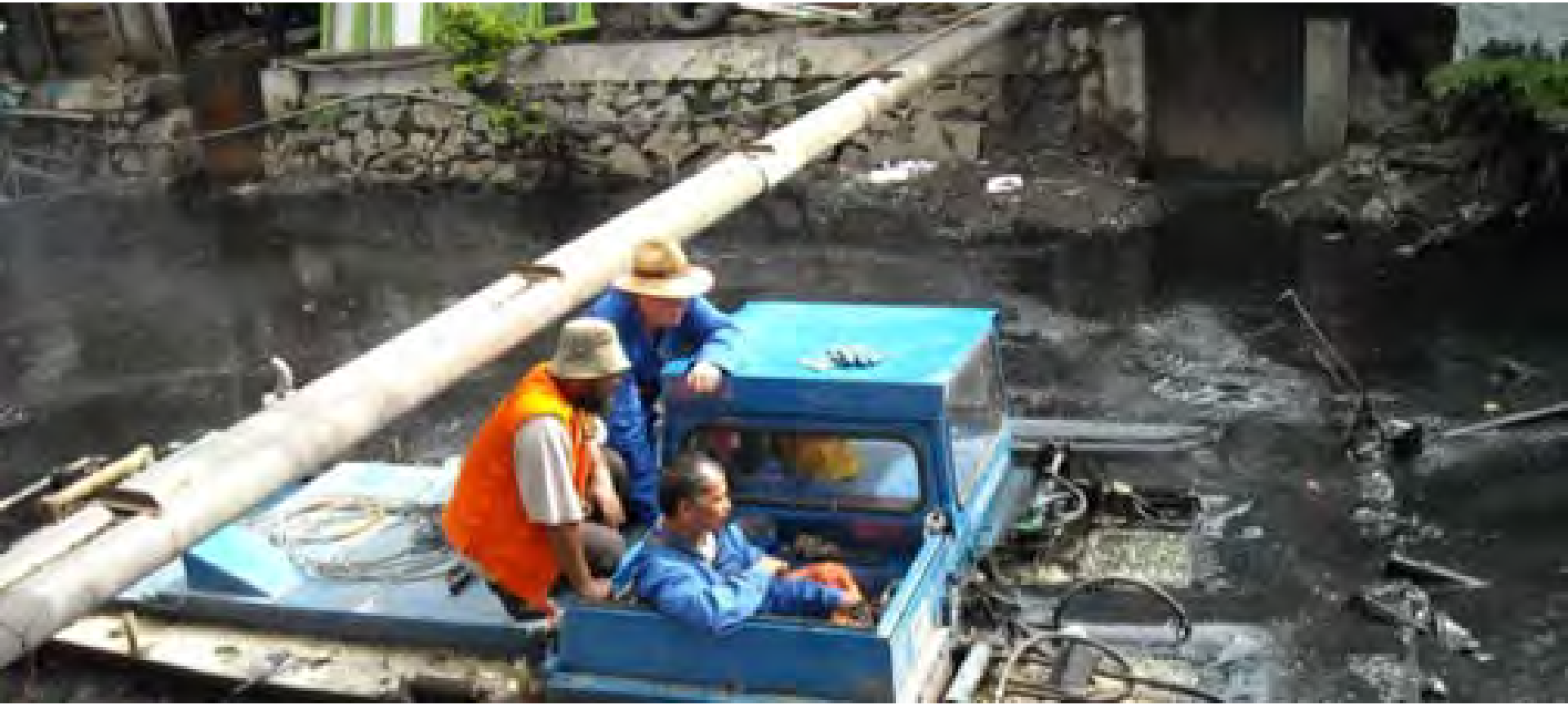
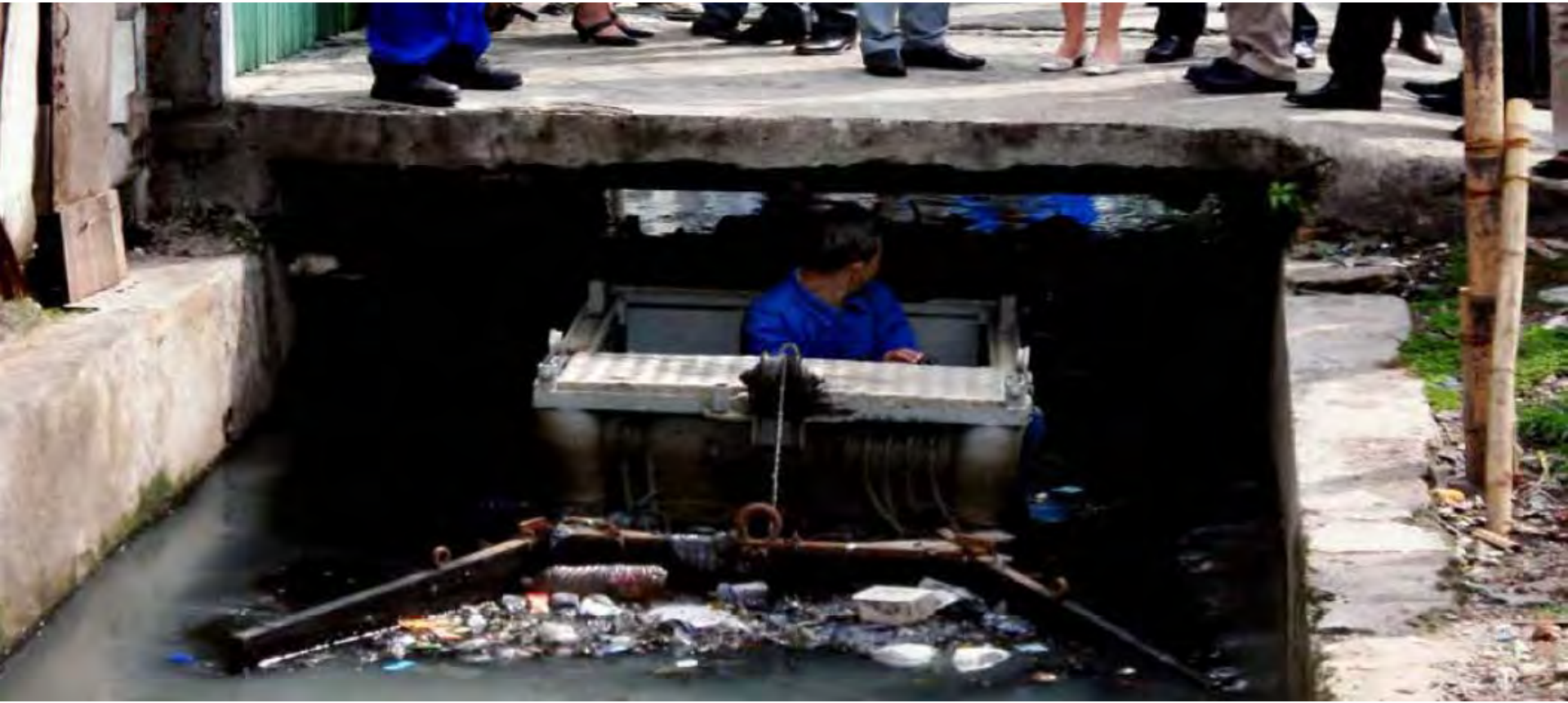
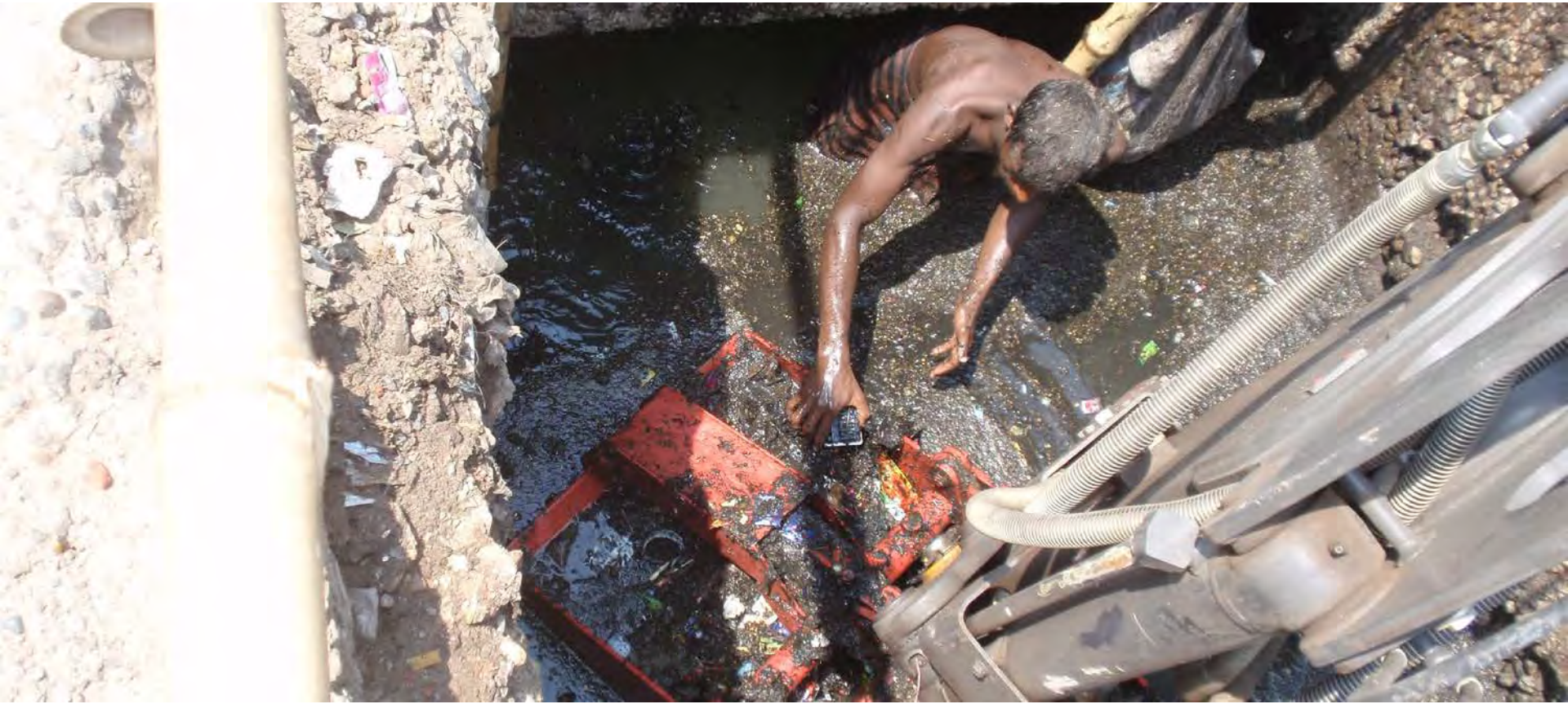
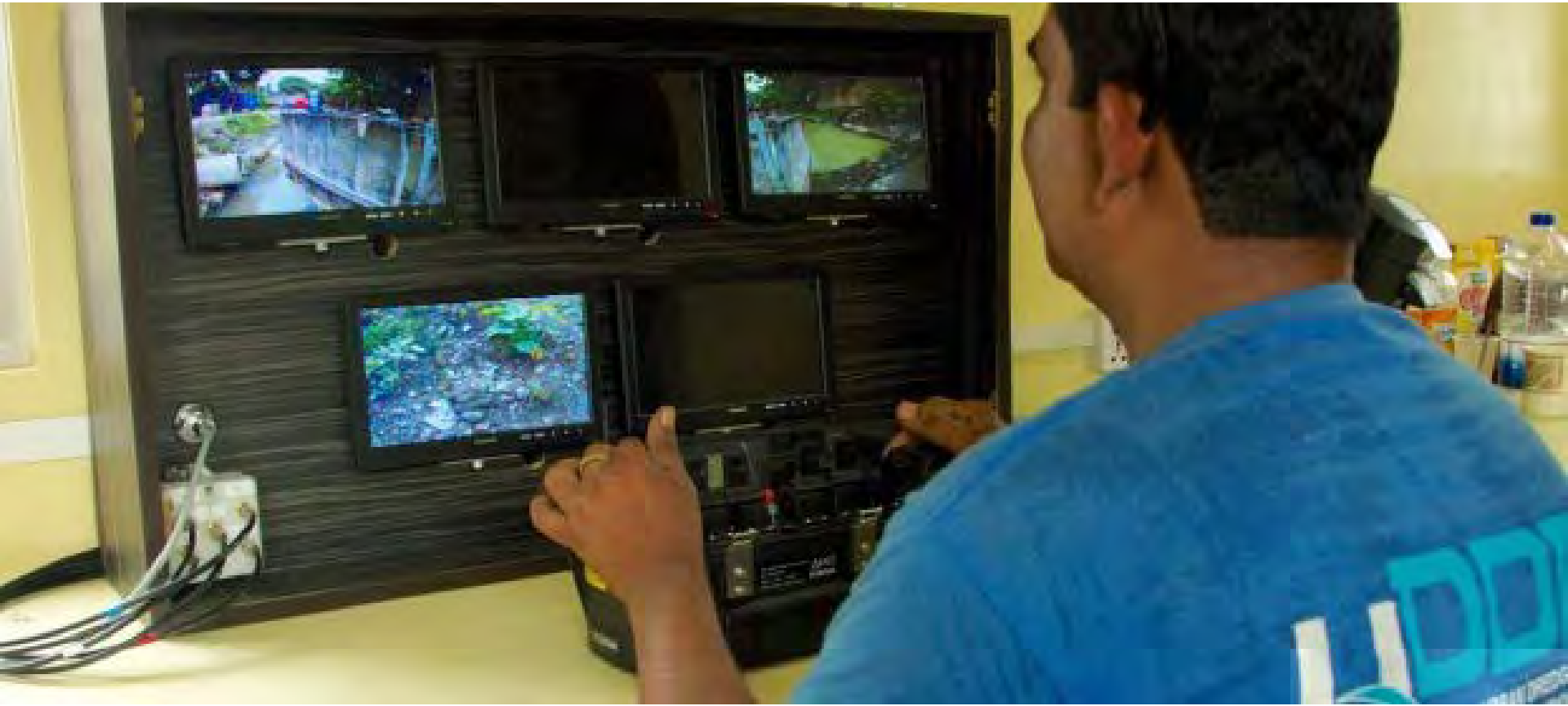


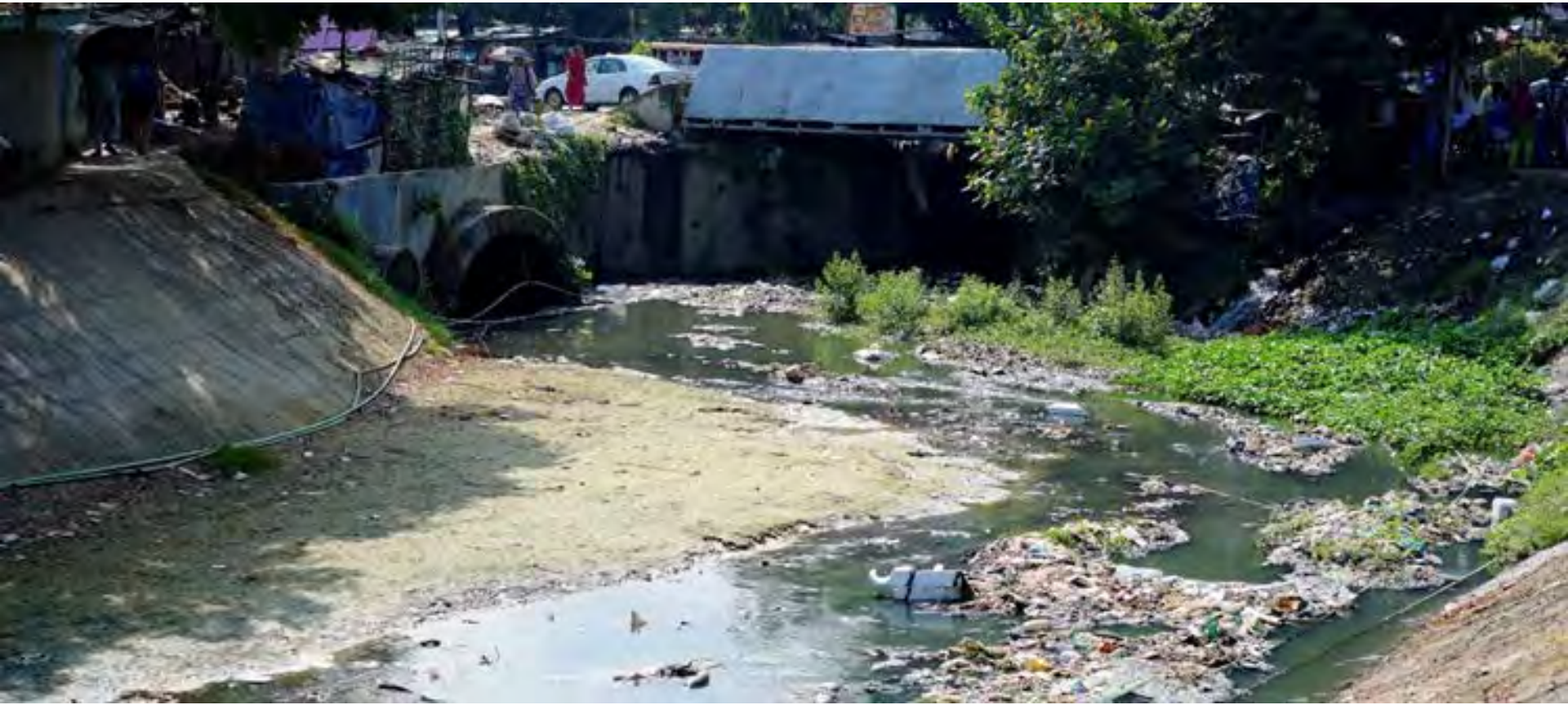


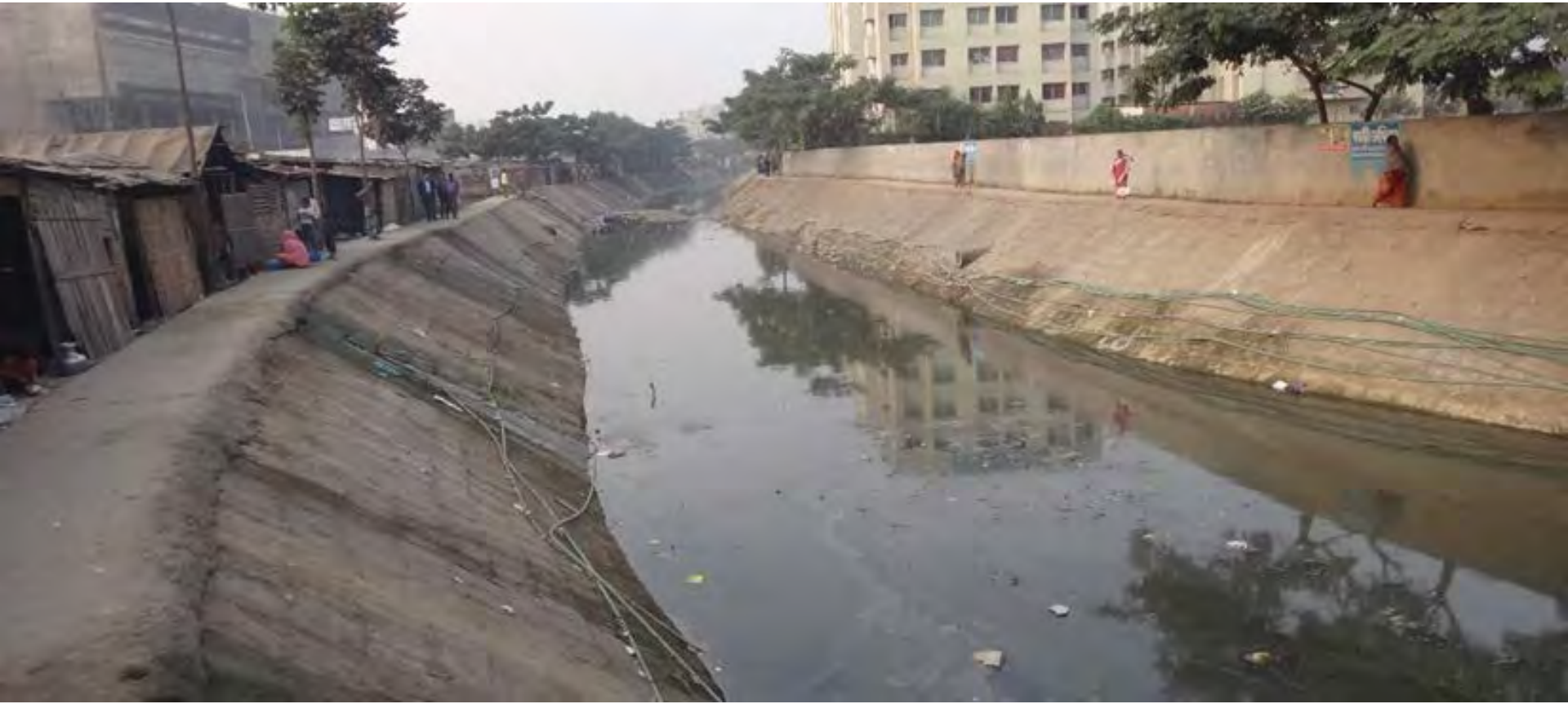


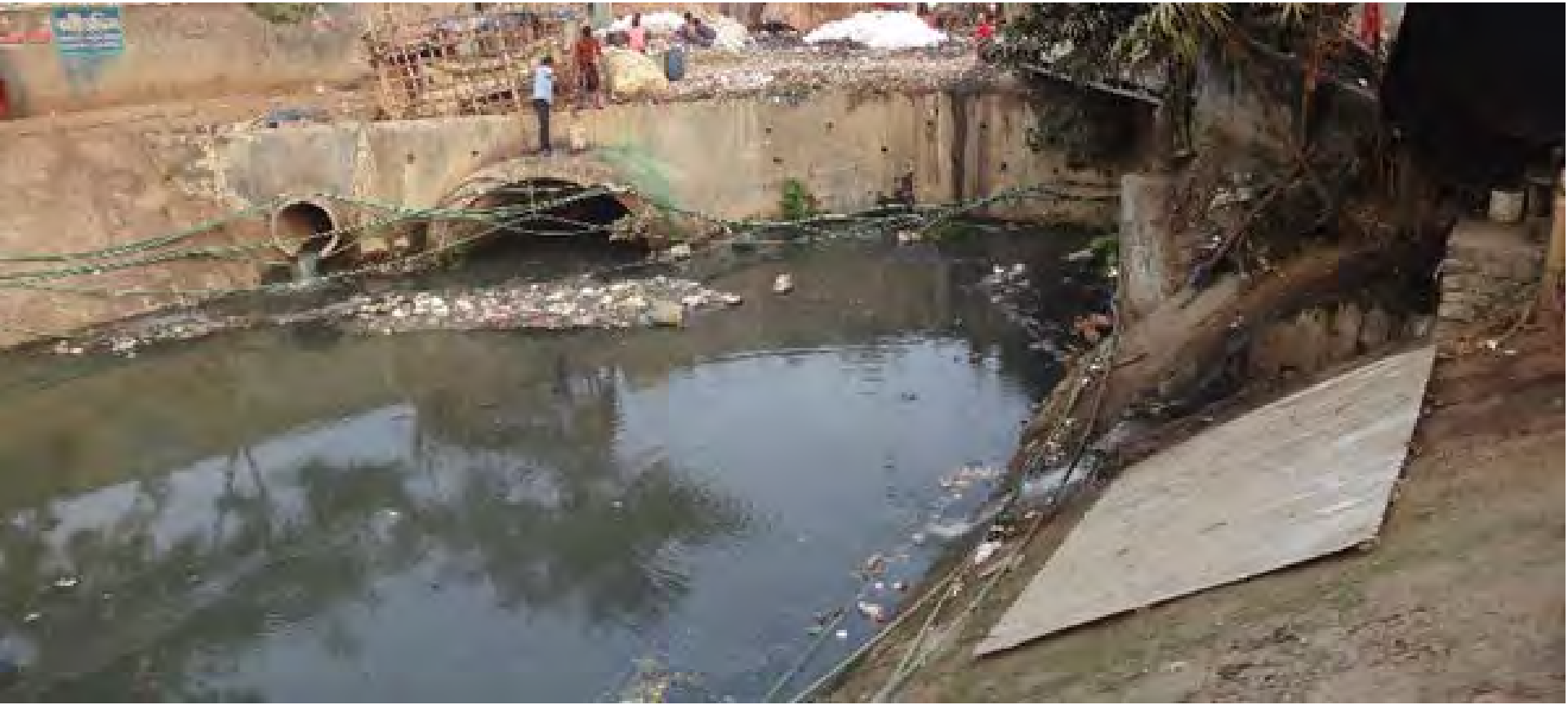


Successful implementation

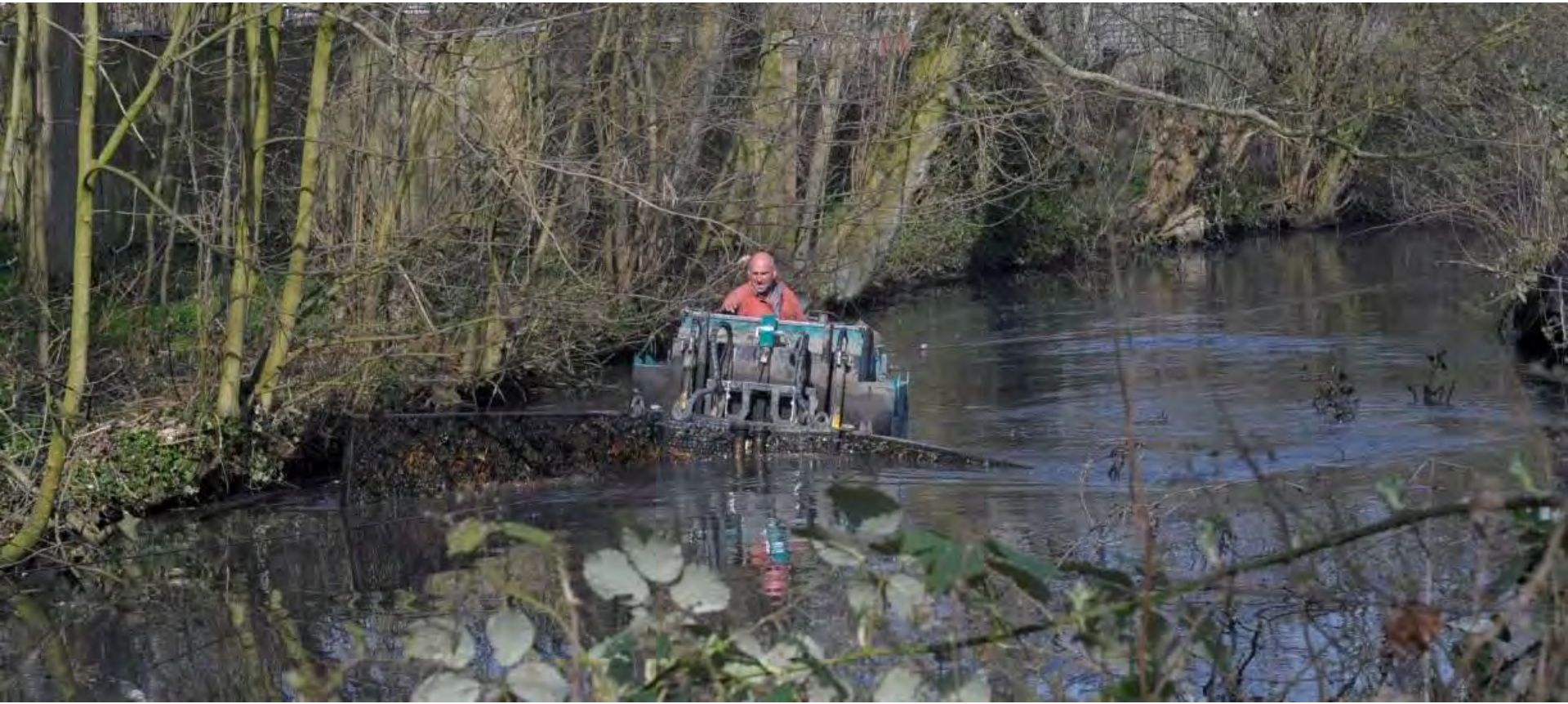
- The production rates resemble marked contrast to normal production rates for maintenance dredging of waterways; 500 m^3 per 8 hours working or 0.5 km/week when dredging 5m^3/m.
- Wire length on the winch is about 250 m.
- The working width ranges from 1.0 to 4.5 m for the small floating bulldozers, when using blades over 5.0 m additional side pontoons need to be fitted.
- The maximum regular dredging depth is about 2 m, with adjustments it may dredge deeper, but it becomes unsuitable when depths exceed 3.0 m.
- The floating bulldozers allow a vertical accuracy of 0.1 m to be realized.

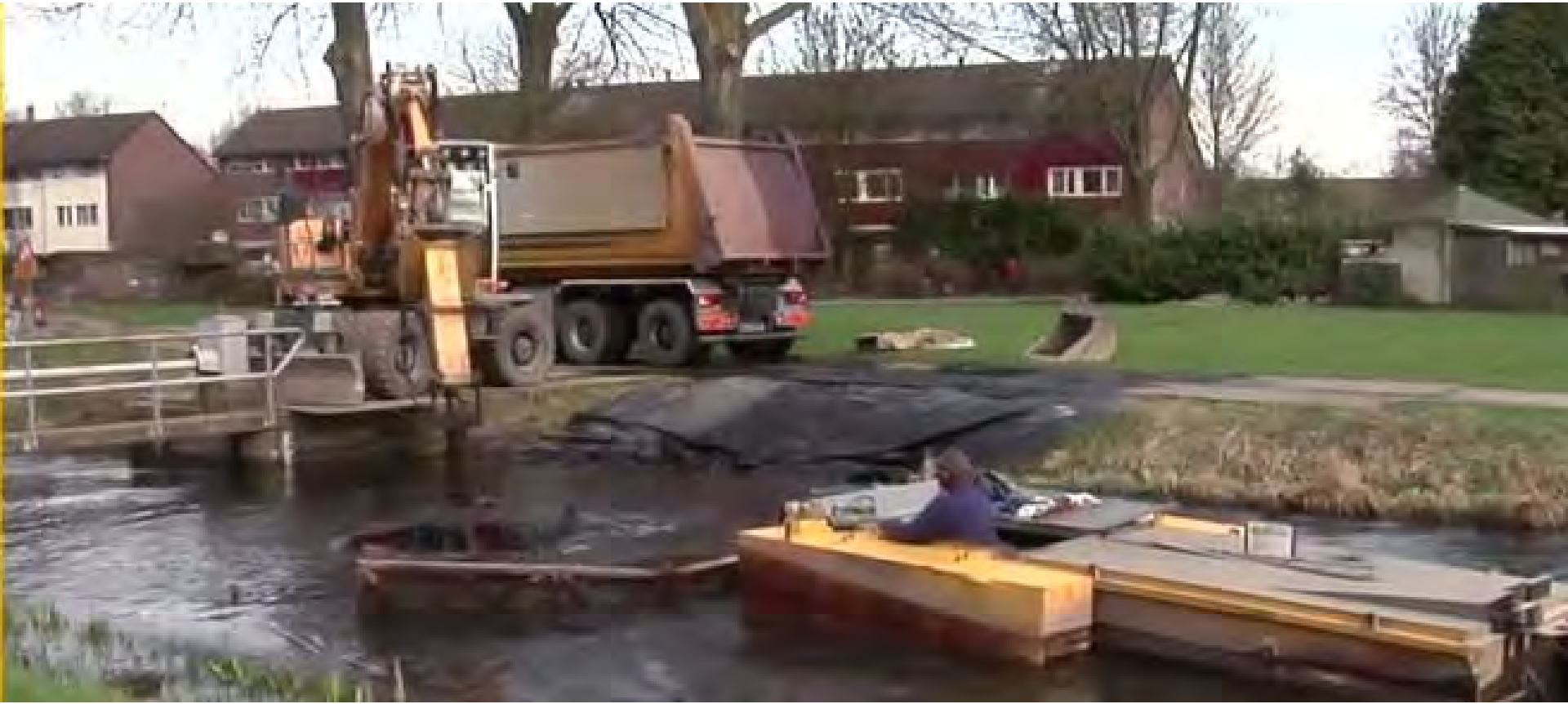


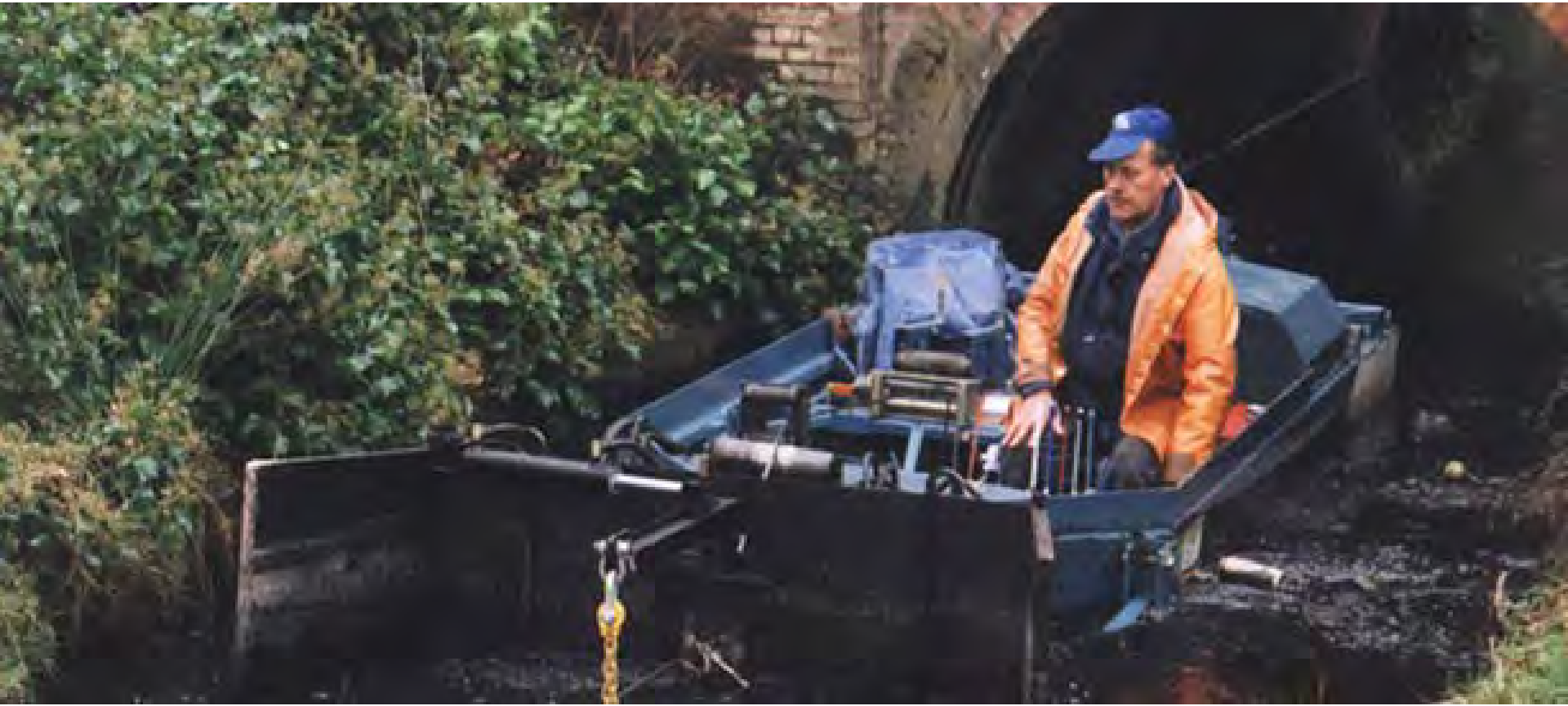


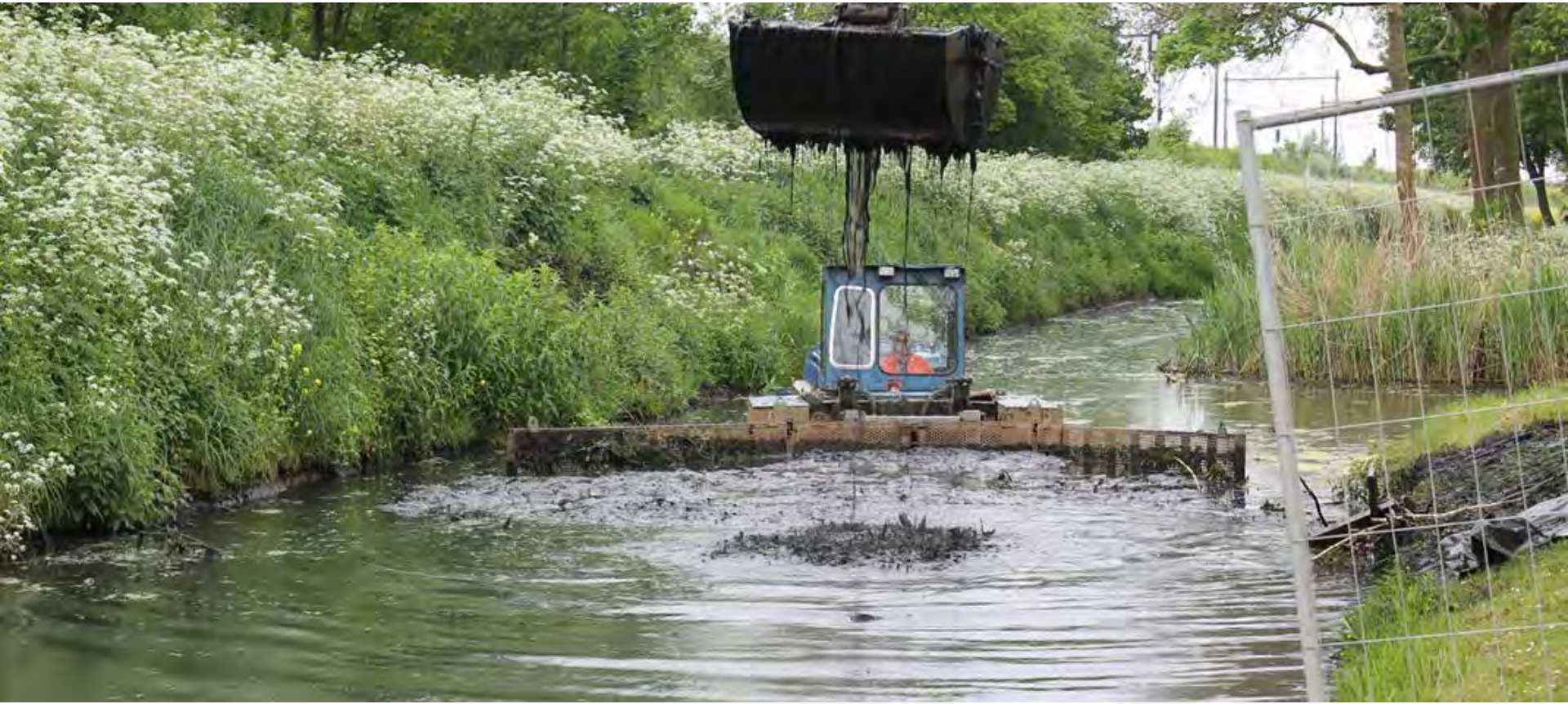


Not only suitable for developing countries





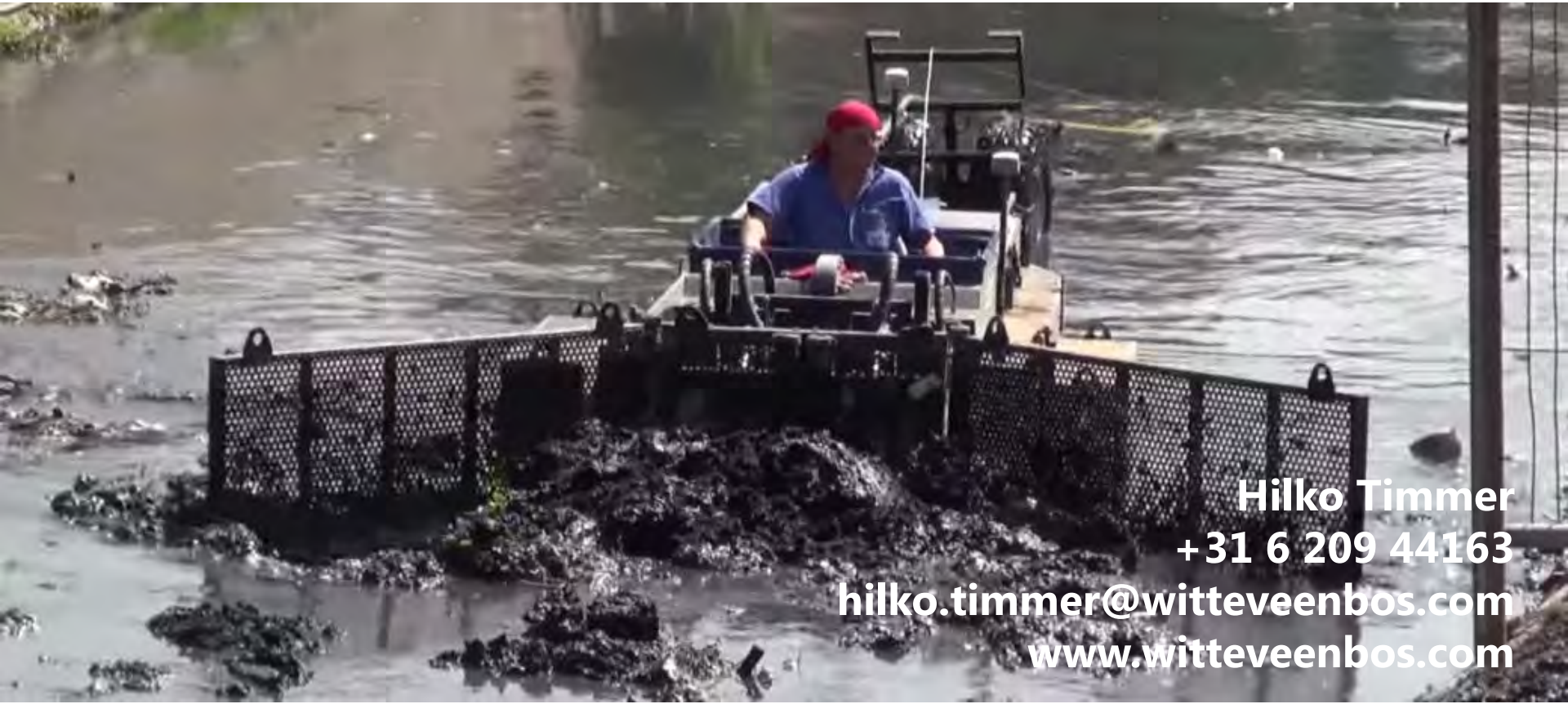




Conclusion

- Small scale urban dredging for flood control is successfully implemented in e.g. Jakarta (Indonesia) and Dhaka (Bangladesh) and has a significant potential for the Americas;
- Small scale urban dredging is essential in urban areas of developing countries for flood control, but also effective in the modern cities for regular maintenance;
- It is not about dredging alone, (soft) engineering is a must.

If there is a dredging challenge, 'Call the Dutch, as the lowlands are world champion dredgers'.



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