

Emergency Sanitation Project

TRENCH LINING TEST

Testing three different trench linings designed for use in first phase humanitarian emergencies when pit latrines need to be dug in unstable soils. They need to be flat pack, easy to use, low-cost and logistics friendly.

How well do they do the job?

Angus McBride

11th June 2014



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DUNSTER HOUSE TRENCH LINER

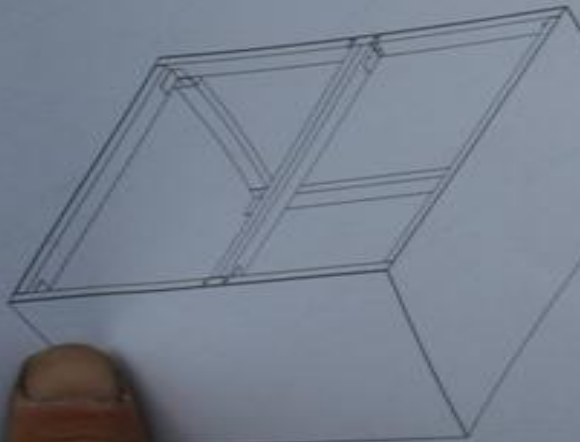


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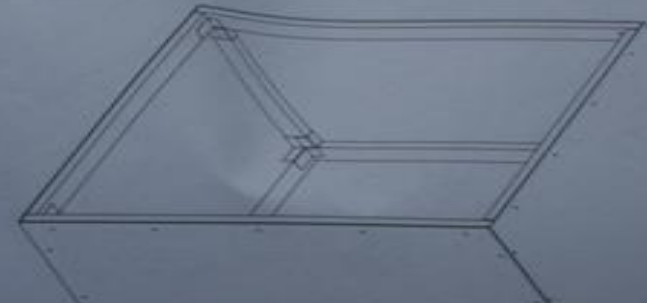
- Packaging was efficient, but if it were shrink-wrapped or similar it could ensure that no bits of wood slipped out when handled roughly in transit
- Could the corrugated plastic sheets come pre-tacked to the wood?
- Webbing straps as handles would also make it easier to handle, and reduce the risk of people ripping the corrugated plastic
- Nails need to be well-packed to ensure they don't spill all over the plane



Instruction Manual
Latrine Support Kit
Double trench
1.6m x 1.2m



Instruction Manual
TRENCH EXTENSION
1.6m x 1.2m



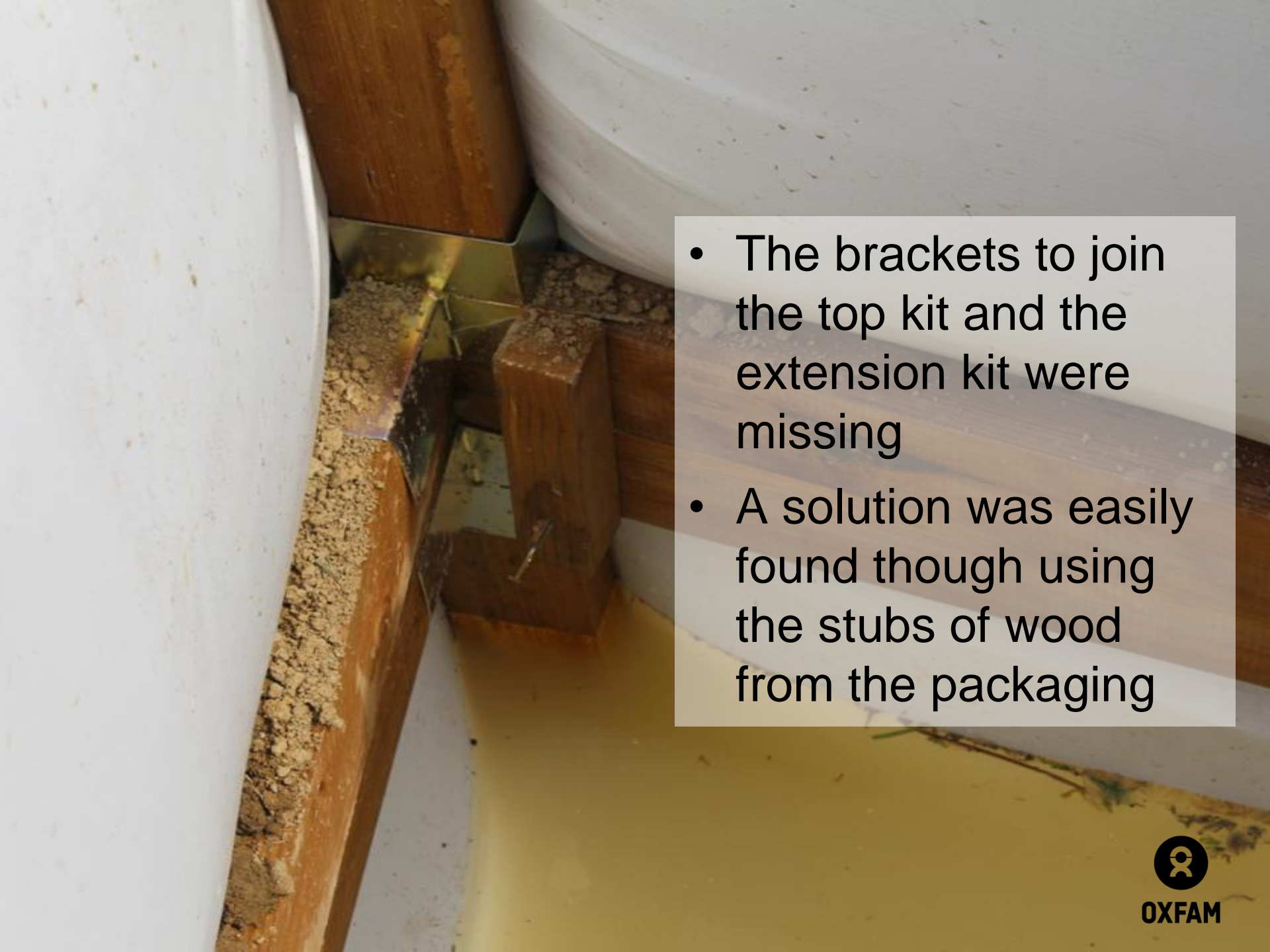
- Generally easy to put together, but small improvements could be:
- Brackets marked 'left' and 'right' are referred to in instructions as 'A' and 'B'.
- Instruction book titles are not completely clear
- Suggested spacing of nails when attaching plastic panels to frame would be a useful information

- Brackets are very simple to use
- If the metal were to go around the corner (exposed face shown in picture) this would be stronger



- Would off-the shelf brackets be cheaper?
- Look up 'Simpson' brackets, which are used a lot for hurricane strapping



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- A close-up photograph of a wooden structure, possibly a door or window frame, showing a repair. The structure is made of dark wood and has several metal brackets attached. Some of the brackets are missing, and the repair is made using small, rectangular pieces of wood (stubs) that are wedged into the gaps. The background is a light-colored, textured surface, possibly a wall or ceiling. A semi-transparent text box is overlaid on the right side of the image, containing two bullet points.
- The brackets to join the top kit and the extension kit were missing
 - A solution was easily found though using the stubs of wood from the packaging





- The frame supports the slab nicely around the very edge
- This allows the trench to be a full 120cm wide and 160cm long, giving a very large volume of storage

- The side panels bulged significantly when backfilled
- But it took a lot of weight before they failed
- When they did fail they did so in a ductile way

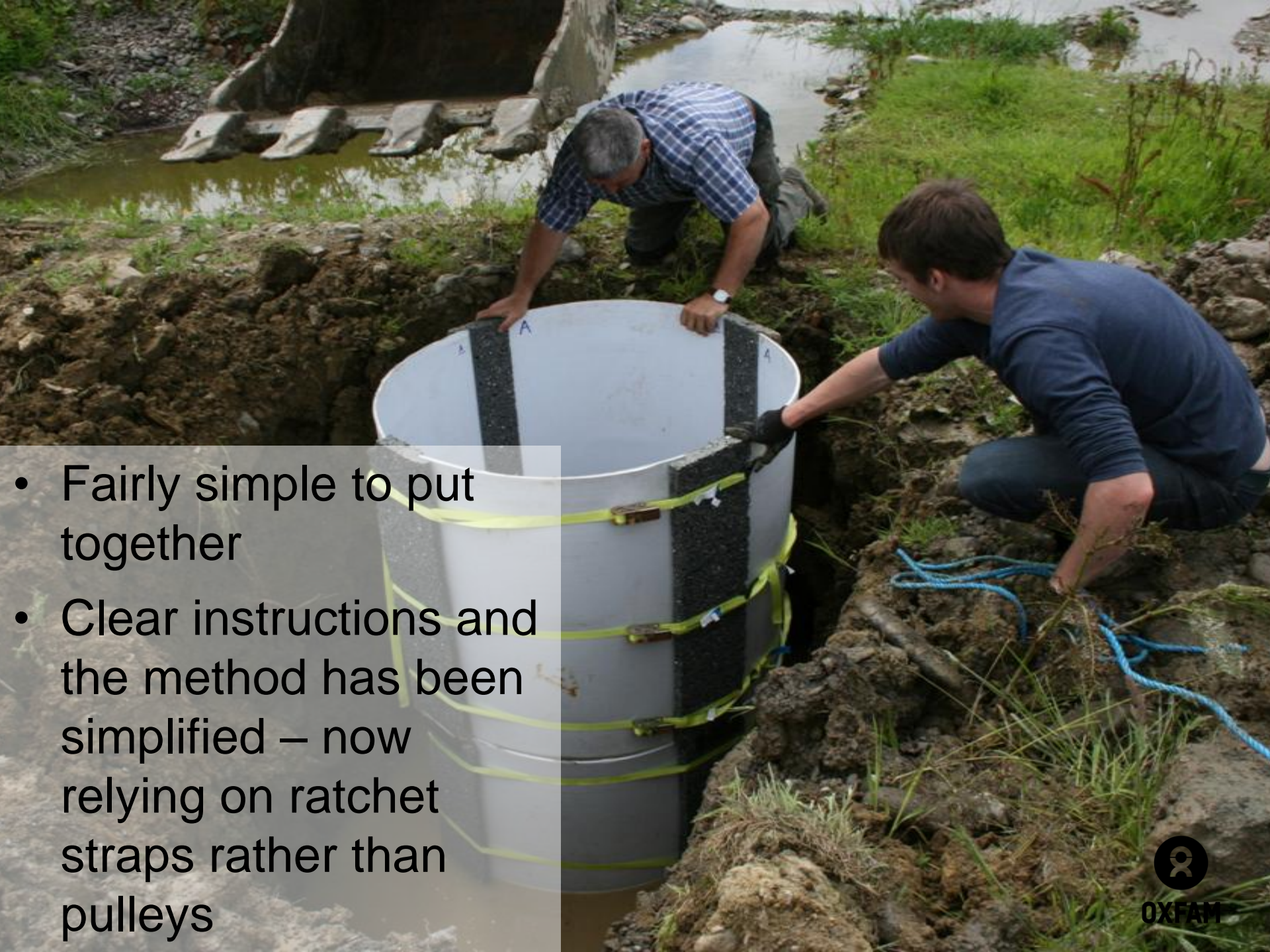


- Arranging frame so that horizontal members are rotated 90° from current position would increase strength
- Putting vertical struts at 400-600mm spacing would also increase the strength
- Struts in the middle at all layers would also increase strength
- Of course, a compromise must be reached between strength and cost/weight



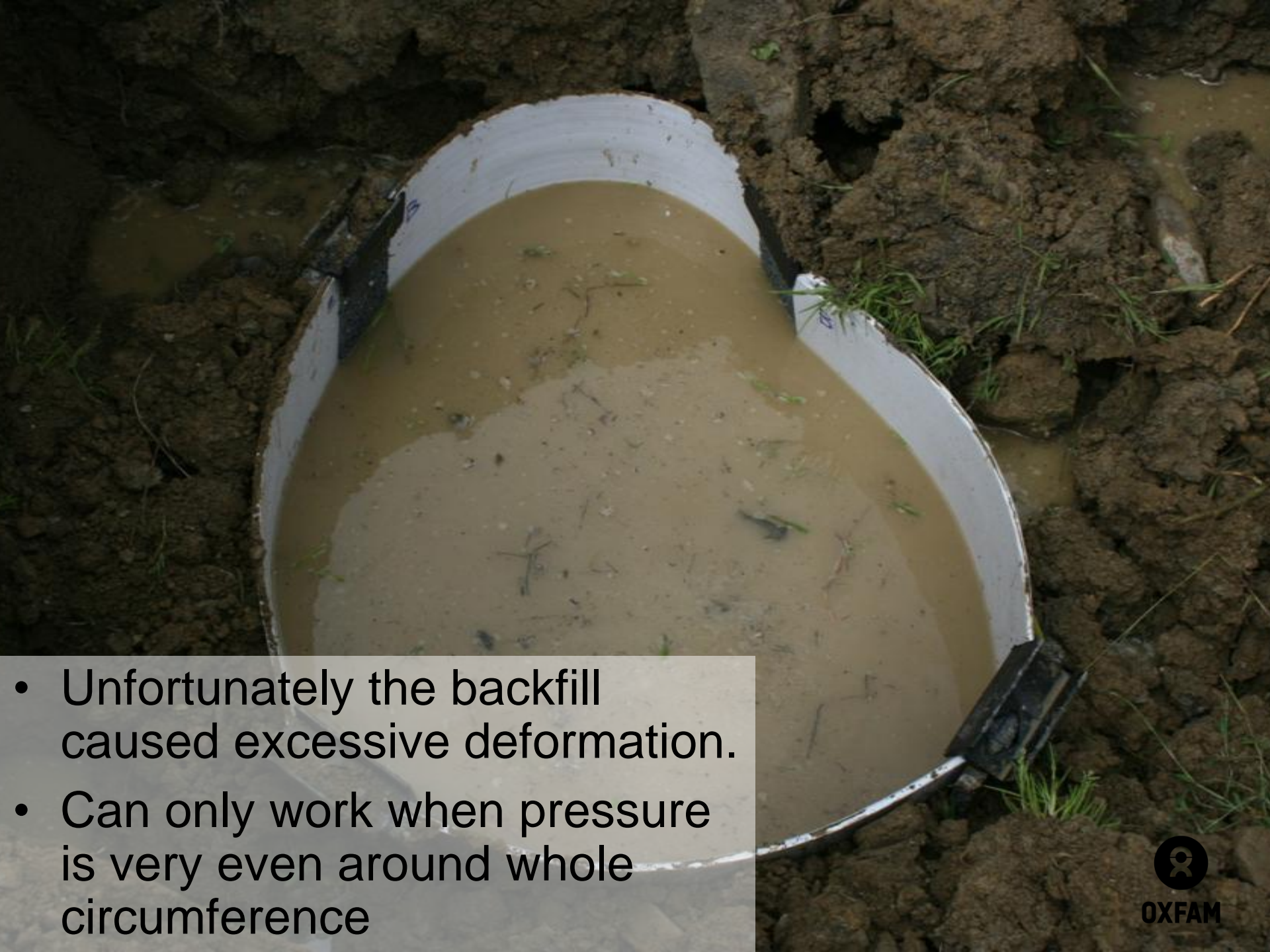
CorrAq Trench Liner

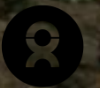


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- A photograph showing two men working in a trench. One man in a blue plaid shirt is kneeling on the left, and another in a dark blue long-sleeved shirt is kneeling on the right. They are installing a large, white, cylindrical structure into the trench. The structure has two vertical black strips on its side and is secured with yellow ratchet straps. A blue rope is visible on the ground to the right. The background shows a stream and some concrete structures.
- Fairly simple to put together
 - Clear instructions and the method has been simplified – now relying on ratchet straps rather than pulleys



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- Unfortunately the backfill caused excessive deformation.
 - Can only work when pressure is very even around whole circumference






Evenproducts 'Evenliner'




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- The steel supports were excellent, and were threaded so that they could be tightened to push against the sides



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- The ends of the liner were a weakpoint. The plastic is only semi-structural, and collapsed when a person stood next to it.
 - Maybe galvanised metal would be stronger?



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- The x-section area of the liner (100 x 150cm) is smaller than the combined area of two slabs (120 x 160cm) so a smaller volume is achieved for the depth dug



TESTED TO DESTRUCTION



Thanks to the enthusiastic Jamie Richardson & Molly Meade of Shelter & Construction Consultants without whom none of this would have been possible.

Thanks also to Rob Evans for allowing us to use his land and digger at no cost, and to the suppliers of the products that we tested: Jenny and Stuart of Evenproducts, Paul and John at Newcastle University and Econoplas, and the whole team at Dunster House.



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