SCOPAC Timber Groyne Workshop 24th March 2010
NOC 10am

AGENDA

10:00 Registration

10:30 Introduction *Andy Bradbury*

10:50 NFDC groyne repair & maintenance - recent advances - *Pete Ferguson*
11:20 Bournemouth Timber Groynes - *Dave Harlow*

11:50 Round the room discussions / short presentations/ questions based on 1 minute, 1 slide issues from participants

12:50 Summary
13:30 End

ATTENDEES

Andy Bradbury (AB)	Travis Mason	Bernadine Maguire
Sam Cope	David Harlow (DH)	Mike Goater (MG)
Pete Ferguson (PF)	Dave Andrews	Matthew Penny
Andrew Colenutt (AC)	Kevin Rhoda	Steve Woolard (SW)
Goshe Gorczynska	Simon Hills	Joe Russell - Wells
Charlotte Millerchip	Paul Ambrose	Paul Cann
Naomi Philp	Alun Brown	Harry Neal (Dean and Dyball)
Sally Hawkins	Caroline Barford	Chris Hayes
Joey O'Connor	Marc Bryan (MB)	Chris Moulton
Jim Moon	Scott Mills	Emma Helliker
Mark Stratton	Sean McCurdy (Civils (UK)	

Presentation 1: Andy Bradbury (AB)-Introduction

Introduction to the purpose of the meeting, and an overview of groynes.

Aims of workshop

- Succession planning
- Involve new people
- Share experiences
- Introduction to different types of coastal engineering
- Develop practical knowledge
- Discuss best practise and historical practice

Groynes

It is worth collating current best practice design and construction knowledge for timber groynes given that there isn't a guidance note or design manual in existence.

When designing and constructing groynes, it is important to strike a balance between capital works and maintenance on groynes. They are designed to smooth out drift fluctuations, and are mostly perpendicular to shore. Groynes ideally extend across the intertidal zone, can occur individually or in systems and are of variable design. Groynes alter the orientation of the beach by changing the beach planshape, and should lead to a smooth transition between protected and natural lengths of coast. Effectiveness depends on beach material at the site.

Disadvantages of groynes include;

- local rip currents
- possible necessity of recharge and
- instability of structures.

There is some uncertainty with groyne length along shingle beaches. Spacing should be based on wave direction, and shouldn't expose the top of the beach or wall to waves. Higher structures are more efficient for sand beaches, with rock preferred for high energy frontages.

Challenges;

- Physical abrasion
- Biological attack (gribble)
- No wave absorption
- Current induced scour
- Lack of stability
- Cost availability of hardwoods
- Difficult to construct below MLW
- Ineffective when undermined

The Beach Management Manual (BMM) suggests that timber and rock groynes are as efficient as each other in wave heights (H_s) of 2 metres, although AB questions this. The BMM also recommends that the groyne crest be 1 metre above the beach. The groyne spacing needs to be close enough to ensure sediment build up so that the back of the beach isn't attacked by waves. Groynes become ineffective when undermined.

The residual life of a groyne on a sand beach is approximately 20-25 years and on a shingle beach is approximately 6 years.

Presentation 2: Pete Ferguson (PF)-NFDC groyne repair and maintenance-recent advances

The NFDC receives £192,000 per year of central government funding for coastal defence. This is primarily spent maintaining defences and access at Milford, Calshot, Barton on Sea and Hurst. Since 2005, the contract for these works has been at competitive tender. This is to improve the partnership between NFDC and the contractor. Civils UK were awarded the contract, which is constantly reviewed in terms of durability, stability, performance, efficiency & sustainability.

NFDC has two sites with timber groynes, Milford and Calshot. These are contrasting locations, with Milford far more exposed.

Milford

There are 22 timber groynes at Milford which maintain the beach in order to protect the seawall. There is also a rock revetment present to the west of Milford. Milford experiences high energy storm waves, primarily caused by Atlantic depressions, and wave heights can be about 4m.

The typical d50 (grain diameter) is about 12/14mm, therefore the sediment is highly abrasive when mobile, and the defences require a high level of maintenance.

The preferred material for the groynes is Greenheart timber, as it's strong and durable. It comes from a 'sustainable' source in Guyana, where the logging is strictly regulated and follows a long-term strategic plan.

The timber pile elements of the groyne are driven down 4m, with 2m above beach level. The piles experience the greatest amount of abrasion and their expected lifespan is typically 3-5 years. Variable beach levels can lead to increased abrasion, with the mid--section of the piles badly affected.

Though the cost of each pile is around £150, the actual cost (incl plant, labour etc) can be 5 times that amount. To reduce this cost, durability reviews are carried out. It was decided to increase the lifespan of the piles by adding protection to them (© Steve Cook). Pile protection is fast to install, can consist of used material and reduces waste and material cost. 10 units can be fitted

per low tide, compared to 3 piles during the same period. Fixings can be stainless steel coach screws or recessed bolt heads, and are reusable. Pile protection systems last about 3-5 years, and it's about 4 times cheaper to replace the pile protection.

The durability review found the fixings on the piles were of poor quality, mild steel. Though this steel is inexpensive, it corrodes easily, requires frequent replacement and is not recyclable. There were 150 bolts per groyne, which were replaced with stainless steel fixings with recessed bolts. These last longer, do not corrode and can be reused. However, these are more expensive (£13 each bolt set, 2010). Need to ensure bolts last as once they deteriorate it gets very expensive and can be £20-25k to replace whole groyne.

The review also highlighted the use of mild steel connecting plates to hold boards together. These were prone to corrosion and were weak points in the structures. To remedy this, boards were connected solely at the pile, and all plates were removed.

The stability review looked at the pile lengths which were found to be too short, which led to a loss of piles, and of groynes. This loss necessitated costly repairs, and led to a loss of beach material and a threat to the seawall. Shorter piles were replaced with longer piles, and an auger was used to plant the piles deeper.

The performance review found the boards did not extend deep enough, making for a less effective structure. The boards now extend to the clay layer, and it is hoped that dramatic beach sediment volume losses experienced between 2002 and 2008 will not reoccur.

The efficiency review looked at the current working methods and this brought about better use of tides, including use of 2 machines and giving people specific roles.

The sustainability review recommended more recycling of materials. Fixings can be reused and boards can be reused and stored and used in other works such as access works.

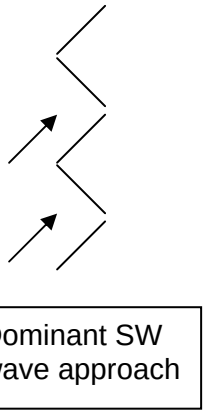
Calshot

55 timber groynes are in place along a 0.9km frontage to maintain the beach. The beach material is mixed, with an abrasive potential, though the area is sheltered from south-westerlies and maximum H_s values of in the region of 1m.

The defence scheme implemented here is a low cost capital scheme, with emphasis on low maintenance costs. Therefore the groynes are designed to be short but effective. The length allows for minimum impact on water-sports in the area. The design is a zigzag, which provides inherent stability and

increases the effective width of the structure. There are compartments to trap sediment, and the groynes hold material at the top of the beach.

(NOTE the zig zag design also prevents waves or currents running parallel with the structure and causing scour).



King piles and walings are made of Greenheart, with Corsican pine used for the rest of the structure. The Greenheart is rarely replaced, while the Corsican Pine is taninised, which extends the life of the wood by resisting bio-infestation by Gribbel. ACQ is now used in the taninising process, as the old substance used has been deemed a marine pollutant. About 8% of the Corsican pine is replaced annually, though this could increase due to the use of ACQ rather than Arsenic or Chromium based treatments. At present the average lifespan of a softwood pile is about 13 years. Galvanised fixings are used to connect the posts to the walings.

Maintenance equipment has become more specialised with time, and is worth about £25,000.

Improving maintenance by:

- Partnership working
- Constant review of working practices
- Generating new ideas trialling new materials
- Improved performance efficiency
- Focusing on recycling initiatives

Questions:

How did you decide to define your service contract?

- PF: An audit was run to look at what was acceptable, 5 years was determined to be good period to develop a working relationship with the contractor but short enough to come up for review.
- Portsmouth City Council noted that they run a 3 year contract and Bournemouth Borough Council a 4 year contract.

- There was general agreement that 4/5 years was an appropriate time frame.

Did you have any problems with stainless steel bolts being stolen due to their high market value (£13 per bolt in 2010 but was double this value a couple of years ago) as it has been a big issue for Arun District Council?

- PF: The odd bolt has been lost in the past but it did not seem that anyone was stealing them.
- DH: Suggested that in Bournemouth, bolts had double nut ends.
- MG: Protects his bolts in Swanage
- Harry suggested that coach screws were far more effective than bolts. The stainless steel bolts had a tendency to seize up during drilling, and that coach screws carried weight much better and were stronger. There was some debate as to whether they could be recycled. Sean thought that bolts are structurally better but coach screws are best.
- PF: NFDC have found coach screws to work very extremely well, but bolts are also still used as there is also the need to occasionally remove and replace boards. The bolts are particularly useful at either end of the board where the pre-drilled holes can be used repeatedly if necessary. This therefore maintains the strength of the fixings and reduces the need to relocate coach screws into an existing hole.
- Sean asked if a coachscrew was quicker to put in than a bolt. Harry replied that they were, because you need two men per bolt, plus an impact wench. In addition, a large amount of the coachscrew can be buried in the greenheart timber and he has never seen a coachscrew broken (i.e. the coachscrew is stronger than the timber). Bolts cannot be buried into timber in the same way.

Have you looked at Douglas Fir as an alternative to Corsican Pine?

- PF: Originally the softwood used was locally grown Douglass Fir. However, an unrelated planning dispute between the Council and the company which provided the wood, led to the timber having to be re-sourced. The softwood which is currently used is Corsican Pine, which is supplied by a company in Blandford, from a managed and certified source

What about recycled plastic?

- PF: Again, it was considered as pile protection but with the heating and cooling that occurs the protection would warp. It's unlikely that it would act any better as a pile. Also there are concerns about the abrasion of the plastic and the introduction of additional plastic fragments into the environment.

Could you use pre-cast concrete as pile protection as this doesn't need to be imported?

- PF: Concrete has yet to be considered for this purpose .

Why use timber groyne and not rock at, for example, Milford?

- PF: Rock is cheaper in the long term so is a consideration.
- AB: If rock was used it would have to be a simple structure, with a large initial outlay. In the long term these would probably be cheaper. However, maintenance would be an issue event though rock groynes to a certain extent are self healing as rock can plug gaps caused by scour and simply be topped up from above. The key to which material is chosen seems to be maintenance and capital grant funding issues. Generally the structures in place are based on what was there historically, which is why a new approach is needed.

Advice from Harry – Maintain your groynes to avoid deterioration and huge replacement costs.

How much of the pile is protected?

- PF: about 2m, roughly a third of the pile.

Are there any studies which look into the various benefits of different shaped groynes? Are zig zag groynes more efficient?

- PF: Not sure
- AB: Different environments may respond better, but I doubt they make much of a difference. All are made from softwood and likely to fail in the same manner. In the end it comes down to landowner preference. The designs all have the same purpose of reducing energy impact, trapping sediment and protecting the sea wall, and rely on the material in the system. The engineer who designed the zig zag groynes first saw them in Norfolk.
- MG: The zig zag shape reduces the likelihood of the groynes being overturned.

What determines the spacing of piles? Why not offset the spacing so that the pile is not in the abrasion zones?

- PF: Structural spacing of 3 metres with 6 metre boards is required, so pile spacing depends on the length of board used. Central section will always be the most damaged area, regardless of spacing.
- DH: could use double boarding to protect the piles but this is very expensive, even when using cheaper materials such as marine plywood which doesn't last as long.

Some West Solent groynes are very dangerous, why are they still there?

- PF: Softwood spikes do present a safety issue, especially for people using the beach but the landowner is ultimately responsible.
- AC: Currently a lot of the beaches in the West Solent are privately owned however, when the Coastal Access Bill comes through the landowner will probably be liable. As a result they'll need to either maintain or remove the remaining groyne piles.

Presentation 3: Dave Harlow- Bournemouth Timber Groynes

Dave worked for 10 years at Havant on shingle beaches and 20 years at Bournemouth on sand beaches. The two areas have completely different beach geomorphology and hydrological regimes and therefore respond differently to groynes, and cannot be compared. Dave focused on the Bournemouth beaches and groynes to illustrate his talk.

Dave Harlow's 7 Rules of Groynes

1. Every beach is different
2. Beaches vary over time
3. Coastal defence works are only undertaken on eroding coasts
4. Anyone can design a single groyne, the art is in designing a groyne field
5. Never rebuild an old groyne until you build a new one, or build a new groyne on an old line
6. Closer groynes are better groynes
7. Bigger groynes are better groynes

Harlow rule 1: *Every beach is different in terms of it's geomorphology and hydrology, therefore there are no generic manuals on timber groyne construction*

In Poole Bay there is much beach variance from Bournemouth to Hengistbury Head. The west of the bay is predominately sand, which changes to a mixed sand and shingle beach in the east. There are 54 timber groynes in the west, and rock groynes in the east of the bay.

Harlow rule 2: *Beaches vary with time*

Beaches are dynamic environments to work in. At Bournemouth there's been an average erosion of 1m/yr (10,000m in 10,000yrs) and adding groynes to this will have an immediate effect on the beach.

Harlow rule 3: *Seawalls and groynes are always built on an eroding beach*

Seawalls and groynes are only ever built on eroding coastlines, so they always have an immediate effect. As soon as they are built, they reduce the sediment input from the cliffs behind, which influences the littoral drift.

The first seawalls were built in Bournemouth in 1907. They have a double-whammy; they reduce the input of new sediment from cliff erosion, and increased reflectivity increases the rate of littoral drift, leading to a rapid reduction in beach levels.

To counter this, the first generation concrete groynes were built in 1915, but whilst they reduced the loss of sediment, there was already very little left on the beach by that time.

The beach levels steadily declined from 1907 to 1970. It was obvious a new approach was needed.

Bournemouth Borough Council began the beach renourishment programme in the 1970s with new beach control structures (second generation timber groynes). This also considerably improved the amenity value of the beach,

The old concrete groynes were permeable, expensive to build and maintain, and too short. They posed a Health and Safety risk to beachgoers, and all were removed by 1990.

Bournemouth began comprehensive beach monitoring in 1974. They remain one of the few beaches to carry out particle size distribution (PSD) monitoring which is very useful to them.

When designing the second generation groynes, 5 types of experimental designs were used in an experiment to determine which was the most effective. Since the 1980's all plank joints are located on the piles

The groynes are 70 metres long and 4.2 metres deep, so that they close onto the substrate to avoid undermining

Greenheart was used as the standard timber, but in 1985 a further experiment was carried out with a variety of planks to determine which was the best and least likely to suffer from gribble infestation. It was discovered that greenheart was the worst, whilst ekki timber was the best. When the ekki groyne was inspected it showed no signs of infestation whilst the greenheart was seriously damaged. However, the 7 ½ metre long planks required are very difficult to find in ekki, and much easier to procure in greenheart.

Bournemouth groynes as a rule survive very well, and have never had a serious failure, in 23 years. They are designed to require very little maintenance. This means the capital cost is high, and the majority of the cost

comes from government grant aid, but there are few maintenance costs for the council.

The 2nd generation groyne field was completed in 1991. A detailed groyne field inspection revealed the older groynes needed replacing. Initially the ends of groynes were inspected by divers, which is highly inefficient and costly. The new CDM Regulations meant that a new approach to the safety of workers was required. A new approach was decided upon, with just 5 planks at the top of the groyne with prefabricated sheet piling panels installed below beach level.

Between1995-2004 a rolling programme was used to install the 3rd generation of groynes.

The new groynes required the same length of 70 metres to catch the littoral drift as Bournemouth has a very shallow beach slope of 1:25. As building the groynes is a very expensive undertaking, the design is very robust, so that minimal maintenance is required. The groynes are built down into the substrate and backed up to the seawall. In order to prevent damaging the sea wall, a concrete stairwell was cast around the top of the groynes to anchor them in place and create access to the beach. The groyne crest was built high enough to prevent overtopping. For the 2nd generation, a crest level of 1.8m OD was used, whereas a crest level of 3m was introduced for the 3rd generation, which also considers sea level rise.

Groynes should be long, deep, attached to the seawall, high and impermeable. Permeable groynes are seen to be useless as they have little effect on drift and require a lot of maintenance.

With the 2nd generation of groynes, planks might be on either the east or west side of the piles and this was down to the contractor's discretion rather than design. For 3rd generation groynes the planks were always on the west side so that they would be in compression rather than tension under the prevailing littoral drift direction. The groynes were also designed to match the preferred beach profile.

Bournemouth's groynes cost £220,000 each. The high cost is mainly due to the limited work times, which in turn is due to the low tidal range in Poole Bay.

In 2006, the Contractors changed from bolts to coachscrews. It was found that many stainless steel bolts seized up when being installed drilled, and you can't apply enough force to them to bend the timber so that the joints are flush.

The new groynes are intended to be completely impermeable. However, even brand new planks may have a 1mm gap between planks. As the D50 at Bournemouth is 0.2mm, this can become a massive problem as the gap gradually increases so that more material can move through. When the gap reaches 5mm, the groyne is essentially permeable. To solve this problem they attempted to fit marine ply to cover the gaps on both sides. However, this

provides a sheltered environment which results in gribble infestation. Through various experiments, gaskets and filling foam were the most successful.

The specification for the pile/plank joints was tightened to ensure the groynes were straight, and the pile spacing specification was relaxed. If the plank/pile joint is flush, then there wasn't a problem with gribble infestation, but if the joint was loose then the wood surfaces was exposed to gribble infestation.

In order to save time and money, all the bolts should have the same diameter, so that only one set of drill bits is required.

Groynes which reach 25 years will be dismantled and assessed. Groyne piles need to be replaced every 25 years, and planks every 15-20 years.

Bournemouth groynes undergo approximately 20-30 drift reversals per year.

Failures:

Some groynes display sideways movement. Littoral drift reverses regularly, perhaps 20 times a year. and the piles were bending as they were loaded. This can slacken all the bolted connections, and the piles at the seaward end of the groynes lean seaward.

Other groynes show signs of heave. Groyne 43 heaved over 1.5 m in a 3 month period. Despite there being no historical evidence of landslip, 7 groynes moved between 2003-2005. The most likely explanation seems to be that the clay substrate has relaxed and heaved, lifting the piles. The movement stopped after the replenishment of the beach, suggesting that the loading prevents movement. The movement was clustered around the clay cliffed region of frontage.

In the 1990's, surveys showed that the beach volume appeared to rise and fall again. This might be due to heave of the seabed. It didn't effect the older groynes-possibly because they were stiff enough to resist. The new groynes are less stiff. All the heaved groynes were the newer 3rd generation.

The groynes are loaded sideways most of the time, but when drift reversals or major storms hit from the East, they do occasionally fail, resulting in panels being pushed out and lost, as the panels are on the west side of the pile. SE storms have mobilised the full depth of the beach in the past, resulting in the panels opening like "catflaps".

As with the current Coastal Defence Strategy for Bournemouth, the new Coastal Defence Strategy Study is likely to suggest that rock groynes should be used for the frontage as they are more efficient and cost effective than timber groynes, but timber groynes take up less space and are more aesthetically pleasing. As the beach is very important for amenity reasons, timber groynes are likely to continue being used as they allow more people to access the beach.

Closely spaced timber groynes also generate many small rip currents, unlike widely spaced rock groynes which generate fewer but larger rips, thereby making the environment safer in terms of life guarding.

Harlow rule 4: ***Anyone can design a single groyne, the art is in designing a groyne field***

It is suggested that having groynes close together and evenly spaced produces even beach levels. Uneven spacing can lead to uneven sediment distribution.

Do not re-use an old groyne location. The clay substrate will be marked by the old piles, and the new piles may wander off line or be weakened.

Harlow rule 5 ***Old groynes should not be removed before new groynes are built***.

Removing a groyne means the loss of the sediment it retains. It can take years for the littoral drift to restore the beach level. Built the new groyne first, and then remove the old one. This is another reason to use a new groyne location.

Harlow rule 6. ***The closer groynes are, the more potential there is to save on beach fill*** making the whole process more sustainable. In the next 60 years Bournemouth need to review their strategy with a possible advance the line policy in order to maintain the frontage.

Bournemouth has seen 4,500,000 m^3 of replenishment over the past 40 years. The littoral drift rate is approximately 250,000 m^3 /annum, with the rate increasing towards Hengistbury Head. There is 70,000m^3 of sediment lost from the groyne field each year, with the groyne field reducing sediment transport to approximately one-third. There is 7,000,000 m^3 replenishment predicted over the next 100 years. Smaller groyne spacing should retain the sediment.

Harlow rule 7: ***Bigger groynes are better groynes***

Beacons:

Beacons are present on every groyne, as groynes can be a navigational hazard. They were recently moved to the landward side of the end piles, which makes for easier installation and less wave impact damage. The beacons were changed form fibreglass to Stainless steel, and made hollow in order to make them last longer, and raised by 1m to counter sea level rise. Beacons are inspected annually by Trinity House. The hollow shape looked smaller, so the overall size was increased by 50% to retain a similar appearance

Questions:

Are beacons really needed?

- DH: They're used as a navigation warning as a lot of trawlers work in the trough just offshore. The groynes are not shown on charts. The beacons are checked every year to make sure they're good enough.

Are there any other cases of heave?

- AB: No recorded incidents of groynes. Have seen sheet piling move (Barton) but its nothing like this, which is very localised.

Does heave matter?

- DH: yes, as the planks buckle and gaps occur, and sediment is lost.

Do gribble attack all or part of the structure?

- DH: generally in the corners of piles in the sapwood section, or along the edge of the plank section. Interestingly, when purpleheart timber was used, the greenheart was left alone, demonstrating gribble preferences. Experimenting with Ekki timber has suggested that it is more resistant to gribble attack than Greenheart.

DH notes that while stainless steel has been used for Bournemouth's groynes, it was a complete failure on Bournemouth Pier Landing Stages. There, continual vibrations from wave impact meant that every stainless steel bolt eventually worked loose, even though double-nutted. Black iron or galvanised steel did not come loose, because it corroded.

Discussion of slide questions:

Why are groynes made of timber?

- DH: The close spacing of the timber groynes and their narrow width allows more beach users compared with rock structures which are so much wider.
- Timber is easier to maintain at low tide than concrete.
- Rock is also highly opposed in some areas by residents who are used to timber.

Paul Cann

Recycled planks in vertical positions are fitted into a groove in the chalk substrate to prevent undermining of the structure. I believe this is known as a fishtail groyne. Perhaps somebody can advise on its use/purpose/what it achieves?

- AB: Fishtail groynes are used to change/control the direction of sediment flow. Normally made of rock rather than timber.

Can anyone explain why there are Y shaped groynes here?

- AB: These are Y shaped groynes designed by Billy Nicholls using local materials for private landowners. They provide some protection to the backshore to buffer against wave action and store sediment in the V shape.

The photo shows a privately owned timber groyne field in the west Solent - the issues for discussion are, the requirement for landowner management plans and the need to assess the implications of whether defences are maintained or not on landowners and adjacent neighbouring frontages

AC: Private and decayed groyne fields may be left in so that if the landowner wishes to upgrade defences later it may be classified as maintenance. However, if the beach is open to the public following the Marine and Coastal Access Act, landowners have raised health and safety concerns associated with these defences in their current condition.

What could be done about the degraded piles at Hill Head?

- Harry: Cut back the piles and either replace or add new piles by digging to the side and bolting on to existing structure. Check that the plank has not deteriorated aswell.
- SW: May well be a waste of time. Revert to rock groynes?
- AC: Get rid of it? AB: No, don't take it out.

Piles have pulled away but only localised movement.

- Possible that the pile is not deep enough as sediment levels are equal on both sides. Below is solution to problem.

The groynes are approximately 10 years old. Question: How do you stop the shingle abrasion which effectively wears out the timber and hence reduces strength and serviceability over a relatively short period?

- To reduce abrasion, use sacrificial timbers from softwood planks, similar idea used by New Forest at Milford with pile protection.

Why is the protection around only 3 sides? Where are the other planks?

- The protection is located on the sides likely to be most damaged. It looks as though the planking isn't high enough and appears to be on the wrong side.

When replenishing the beach at Bournemouth, some of the groyne bays were filled to the top of the groynes. Why does this happen? Does it affect how the groyne works?

- DH: The main reason is that piling the new sand above Mean Low Water makes surveying the new material added to the beach much easier.

- The beach will reach its equilibrium profile naturally in approximately two days, so the short-term burial of the groynes doesn't matter.

- At Hayling Island, the replenishment was placed a little higher than the usual wave run-up level, so cliffs up to 2m high formed, which were dangerous. Residents objected to the high crest level, which obscured sea views.

At Bournemouth, by designing the replenishment crest below the ultimate natural level, the sea pushed sand up the beach slope to form a natural looking beach crest, at a much higher level than the public would have accepted by bulldozing.

- This also prevents coiffing because sediment is moved up the beach, not down. As the sea does the work, filling the profile down to the depth of closure, the cost of plant, and Health and Safety issues below MLW is avoided.

Mark Stratton Hayling Island, Hampshire

If groyne bays are full up like these, are they deemed to be a success in terms of coastal management?

- MB: Groynes work to maintain levels, still have to recharge as this only slows, not prevents the drift process; groynes act as speed-bump to erosion.

Has timber shuttering at the back of the beach been implemented to store sediment between the castle walls and the shuttering to provide an additional barrier? Also, the groynes are very closely spaced, is this in an attempt to store as much sediment as possible within a smaller area?

- AB and Harry: The groynes here have existed in one form or another since the 1600. They are not efficient because of severe erosion of the seabed. The groynes fall under the remit of English Heritage, which doesn't have a large budget for maintenance at this site. Maintenance does not seem to be ongoing.

Is a permeable groyne an oxymoron?

- All agree.

The groyne piles seem to be spaced quite widely apart, and I would ask how efficient these types of groynes are compared to solid groynes, especially with smaller grain sizes.

- Again, the problems with permeable groynes and large spaces. AC: It's likely that the only reason they're still there is that there's a huge cost for removal.

Swanage groynes – why are piles so thick?

- DH: Consultant followed the Bournemouth standard of pile thickness but aren't really necessary as Swanage is much more sheltered. Shows that transferable designs don't work.

The EA don’t actually have timber groynes in the South-west.

All the timber groynes are on amenity beaches and looked after by local authorities. Instead the EA have shingle beaches and restore them with beach recharge. Would it be beneficial for the EA to have timber groynes instead of this? Is there a benefit in using timber groynes over rock groynes for amenity purposes, where as the beaches the EA manage are for coastal defence purposes?

The only beach the EA manage with a groyne is at Preston and this is a rock long groyne.

Additionally to this is the EA's timber policy. This has been developed to ensure timber procured (particularly tropical hardwood) is obtained from a legal and sustainably managed source. The EA have to ensure that the suppliers can provide documentary evidence of this. Do other authorities strictly seek to obtain sustainable timber?

- It's largely accidental that this pattern occurs. People generally follow what they've been used to historically. Rock groynes are a relatively recent development.
- At some amenity beaches such as Swanage, beach hut owners own the beach in front and would be unwilling to sacrifice it for a rock groyne, as rock groynes take up more space than timber.
- Tonne for tonne timber is more environmentally damaging, but in terms of structure for structure, rock has a much greater cost than timber.
- Most codes now follow sustainability practice set by the FSC, where sustainable and legally farmed trees are used, with an emphasis now on sourcing certifiable timber. There is no domestic wood left for this purpose.

www.poolebay.net

Naomi Philp

What is the reason behind this double groyne at Southbourne?

- DH: The original design was for a permeable groyne, but it was never effective. It was very susceptible to damage. The exposed end has recently been replaced with rock. The 2 remaining concrete groynes have proved to be the best but they are very expensive to replace. Rock is generally the easiest option.

Steve Woolard

Friars Cliff beach, Christchurch

My example is of an old timber groyne which we converted to blockarmour on Friars Cliff beach.

- SW: The timber groynes were slowly converted to rubble/rock armour as the remaining timber was falling down. If the damage is at the seaward side of the groyne, repairing a wooden groyne can be difficult and expensive, whereas replacing with rubble is much easier. When working out the costing, the conversion practice is (in the long run) cheaper and quicker than simply replacing timber groynes. As the groynes are basically self healing, they only really require regular topping up every 2 years, which is more frequent than timber maintenance, but still works out cheaper.

Additional information

Tom Mortlock notes that Ian Thomas (Pevensey Coastal Defences Ltd) has been using plastic groyne panels instead of hardwood and says they have been more resistant than adjacent wood groynes on Pevensey frontage. He's been responsible for defence of Pevensey frontage from a 1:400yr storm since 2000, until 2025.