Construction and demolition waste in Malta

by **Angelo Xuereb**

MY PROPOSALS on how to deal with the problem of construction and demolishing waste in Malta are based both on 30 years of practical experience as a building contractor as well as from various positions I hold on numerous boards, councils and committees.

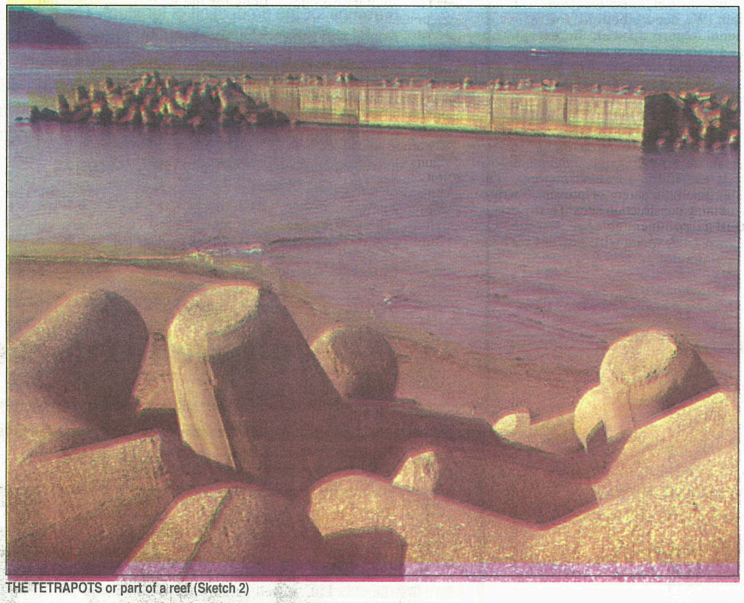
My expertise is infrastructure, and I sincerely hope that some form of action is taken immediately to tackle this major issue. I have been writing and commenting about this for a long time but it seems that long-term plans were never on any political agenda, thus a short-term solution always prevailed.

The present massive landfill nicknamed 'Mount Maghtab' was further aggravated as a result of a wrong decision taken around 20 years ago. During one of my presentations as chairman of an environment steering committee within the Chamber of Commerce, on February 4, 1993, to the then Parliamentary Secretary responsible for the Environment, I had suggested very clearly that clean inert construction waste should be disposed of in used quarries and not in the landfill. This was objected to.

We are now faced with the aftermath of having created a massive black spot on our island. My proposal was only adopted four years ago, but the waste has increased from around 500,000 tons per year to over two million!

I would start by asking a simple question which every government should be addressing continuously on various aspects of its decisions – are we planning long term, say 25/50/100 years? In terms of C&D waste, the answer is no. We may only be planning for the next five years.

Unfortunately statistics were never accurate, since certain volumes of waste used to be dumped in private quarries without being accounted for.



THE TETRAPOTS or part of a reef (Sketch 2)

The volume of C&D waste has been increasing substantially over the past years. And today's two million tons are bound to increase. As the price of land increases, the demand for further excavation increases and therefore the total volume of C&D waste will continue to rise.

Let us make a distinction between construction waste 'C' and demolishing waste 'D'. I calculate that 70 per cent of all C&D waste is composed of excavated construction, which is clean, inert material, while 30 per cent is demolishing waste, which may be contaminated with lime, paint, wood, steel etc. The latter is more of a problem.

Let us take a 25-year plan, not 50 or 100 years! Do we have enough old quarries to fill up during the next 25 years? The answer is definitely not. We may manage to stretch it for the coming 10 years.

What are we planning for this generation and future ones? To create another man-made mountain? I hope not. The outcome of these queries clearly indicates that this is a major problem which needs to be addressed now.

It is imperative to maximise the re-use/recycle principle. Inert construction waste could be used for many purposes with immediate effect, certainly not dumped into used quarries, while demolition waste can be sorted to some extent for re-use as building material of used stone features and rubble walls, and the excess (excluding recyclable material) could for the time being continue to be dumped in disused quarries.

Excavated rock, which we refer to as 'construction waste' could be used for mass concrete, although it does not have the crushing characteristics as that of hard stone gravel. With larger masses, this same objective, as that of using hardstone, can be achieved.

I have tested a few samples of concrete testing cubes to demonstrate the difference between concrete, using globigerina limestone (soft stone gravel) construction waste and lower coralline limestone (hard stone gravel).

In both mixes I used the same quantity of cement and the same type of sand. The result is that the soft stone achieved the compressive strength of 14.2 N/mm after 9 days, while the hard stone gravel achieved 21.8 N/mm.

The results achieved after 14 days were 16.5 N/mm?? for soft stone and 25.5 N/mm? for hard stone. This means that on average, the soft stone mix achieves two thirds of the strength achieved by hard stone, which is quite remarkable.

Density and mass are almost identical. The weight is almost the same, but may not be of so much importance, because the soft stone absorbs more water and may give distorted figures. With such relatively good results, we can make use of this by-product for various uses.

- Tetrapots for the use of breakwaters
- More uses in road construction
- Creation of artificial islands.

Tetrapots or quatropots

Normally these (Sketch 2) are composed of hard stone gravel mix and weigh around 20 tons each. This weight is normally required so that these are not washed away by the strong waves. However, if these units are cast with soft stone, but with larger volumes, say 30 tons each, these could achieve the same performance.

These pre-cast units (Sketch 3) could be used to create local wave breakers or artificial reefs in the mouth of a number of coves or bays which surround our islands. These could be up to four metres below sea level, acting as a shelter for yachting and swimming.

Where appropriate, these reefs could extend to, say, four metres above sea level to create an ever better shelter to bays and boats. With the ever increasing number of yachts, within a few years' time, we may end up with no place to moor them during a weekend in summer time, with a wind force 4, which is quite common in our waters.

Furthermore, yachting is a lucrative tourism segment and should be encouraged. Therefore the positive impacts with these artificial reefs are numerous. Such reefs will protect the existing sandy beaches from being washed away, and will help increase sandy areas.

One has to keep in mind that such artificial reefs attract more marine habitats and this could indirectly revive this dying sector. Furthermore, by leaving channels on both sides of the bay, the natural water flushing of the sea water will not be disturbed.

As an example, these artificial reefs could be located at the mouth of :

- Marsascala Bay
- St George's Bay
- Qalet Marku (Bahar ic-Caghaq)
- Salina Bay
- St Paul's Bay
- San Niklaw and Santa Maria, Comino
- Marsalforn, Gozo

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More uses

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Although during recent years the use of soft stone gravel as sub-bases for road construction was accepted, we can make more use of this material.

If one goes deeper into the reason why our roads always end up with a smooth and slippery surface (this also refers to roads constructed only five years ago), one realises that due to the low grade of hard stone for this purpose, the top wearing course becomes smooth and slippery.

It will be inevitable that better quality gravel for the top 50-mm tarmac wearing course would have to be imported from another country. I suggest that, instead of the usual tarmac base course, we use a thicker concrete base bed using soft stone as its gravel, which at present is a waste.

One has also to keep in mind that hard stone quarries are more damaging to the environment, since this type of rock is normally found in ridges or valleys. Therefore, any reduction in this use should alleviate this problem.

Furthermore, the large blocks of concrete which presently are being used as retaining walls, must stop using good quality hard stone gravel, but should use soft stone gravel which is being wasted. Their performance is to create weight and nothing else! It is unwise to think of this waste!

Creation of artificial island on Hurd Bank

It is a known fact that clean inert excavated rock does not cause any harm to marine life. Over millions of years, the globigerina limestone has been made up of layers of seashells and sand.

We are also aware that the majority of our immediate surrounding sea is very deep to the tune of over 100 metres. The fact that clean excavated rock from large projects is being dumped into deep sea of over 150 metres does not make sense.

We should at least make use of this material in an area where we can create an artificial island in the long term, 'Hurd Bank', which is only 12 km away and is around 30 to 40 metres deep. One can adopt the same principle of tetrapots cast with soft stone gravel on the periphery of this island and loose material on the internal part.

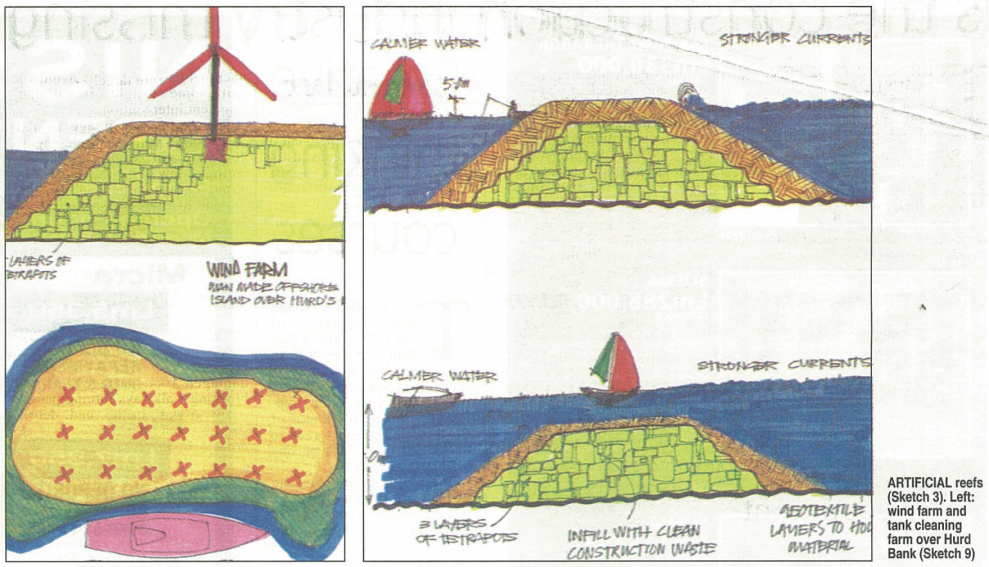
This artificial island (Sketch 9) could be used as a large scale wind farm which indirectly helps reduce air pollution by producing a clean renewable energy. It can also be used as a tank cleaning farm which presently is a threat to the vicinity of Ricasoli in the Grand Harbour. Furthermore, this island can also act as a sheltered area for ships in waiting to be called into harbour.

Long-term planning for construction and demolishing waste is crucial and must be taken seriously, away from any political agenda. I'm not saying that my proposals are complete, since I haven't tackled demolishing waste in detail.

The proposed SmartCity will be generating a huge quantity of inert construction waste. I hope we shall make better use of such material. Construction and demolition waste is one of Malta's main environmental issues and, especially now, with the help of EU funds, our government should partly finance the necessary costs to turn these ideas into reality.

I hope this will be taken on board by the authorities concerned. Many reports have been written and discussed. It's about time to turn words into action. I am a firm believer that action moves faster than words. I hope immediate action will prevail.

Mr Xuereb is a Building Industry Consultative Council representative.



ARTIFICIAL reefs (Sketch 3). Left: wind farm and tank cleaning farm over Hurd Bank (Sketch 9)