

***Creating Real Value Products for  
road, rail, sea, river and canal  
applications made from  
Mixed Plastics Waste***

**“The revolutionary process to deal with the  
macro-scale problem that affects us all”**

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# Revaluetech Project aims and objectives

*For the past 30 years composite products made from mixed plastic waste have been marketed at prices considerably higher than the concrete & wood products they replace. This has been due largely to the inefficient technology used in their manufacture. The markets therefore have remained “niche” at best relying on the environmental & maintenance free durability they offer.*

*With this in mind we set out to:*

- Develop an efficient, fully automated process to manufacture a wide range of composite products made from mixed plastics waste arising from household, industrial & commercial arisings consigned to landfill;*
- Ensure the validity of the products in terms of their physical & environmental performance ;*
- Prove the fully automated process technology & the products in field trials;*
- Enable products to be marketed at prices that compare or even undercut those paid for the concrete & wood products they replace*

# What we have achieved

- *Enabled products to be marketed at prices that compare or even undercut those paid for the concrete & wood products they replace;*
- *An environmentally safe manufacturing process that saves 95%+ of the carbon emissions associated with manufacture of concrete;*
- *Fully automated production that is versatile in being able to manufacture a wide range of different products and at the same time allowing mould changes without interrupting the production cycle;*
- *Every product field trial with major construction companies has proven 100% successful in their physical & environmental performance.*
- *Products which offer far superior physical performance compared to hardwood imported from tropical rain forest regions;*
- *60% + weight saving compared to concrete, providing significant savings on delivery fuel, by faster laying & lower mechanical handling costs;*
- *Products that protect human health by avoiding generation of carcinogenic RCS (Respirable Crystalline Silica) which occurs when cutting concrete on site;*
- *Maintenance free, long service life products that avoid costly & environmentally unsafe treatment prior to use, as in the use of creosote to treat rail sleepers.*
- *Products that can be recycled at the end of their service life.*

# Composite products for specific markets

## **Railways:**

- **Rail sleepers (light and heavy duty), bridge and crossing bearers, cable troughs, fencing , revetments**

## **Environment – Climate Change (Sea, River and Canal):**

- **Sea walls, Groynes, Dock Pilings, Jetties, Sluice gates, Weirs, Revetments, Fixed and demountable Flood Barriers.**

## **Highways:**

- **Road kerbs, Paving kerbs, Drainage channels, Fencing**

## ===== COMPOSITE PRODUCTS FOR THE RAIL INDUSTRY =====>

- **COMPOSITE RAIL SLEEPERS** - *eliminate the need to use carcinogenic creosote treatment of wood and offer a far longer maintenance free service life than concrete wood or steel. They have been in use for more than 17 years in the USA having gained “AAA” rating unlike concrete, wood or steel. Having used our experience from the original USA project we have developed and proven our own state of the art process technology, bringing cost competitive, sustainable replacements for traditional sleepers.*
- **BEARERS** - *for crossing switch and bridge bearer applications eliminate the supply problems in trying to source consistent quality and availability of hardwood in extra long sections (up to 6 metres)*
- **REVTMENTS & PILINGS** – *for land slip containment & flood defences.*
- **FENCING** - *will never rot or be a food source for animals, vermin or insects and avoids expensive metposts or concrete as a foundation.*
- **CABLE TROUGHS** - *our security enhanced design © minimises cable theft.*

## ***There are a number of compelling reasons for these products to be used:***

- ✓ ***Less than 40% of the weight of concrete saving delivery costs and yet far more durable in the applications described;***
- ✓ ***Effective, environmentally safe replacement for carcinogenic \*creosote\* treated wood sleepers (\* to be banned from 30 April 2018);***
- ✓ ***Sustainable and longer lasting alternative to hardwood imported from tropical rain forest regions;***
- ✓ ***Consistent quality products, combined with sustainable availability to meet industry standard sections and lengths;***
- ✓ ***Manufacturing process saves 95% of the carbon emissions associated with concrete production;***
- ✓ ***Much of the input finite resource plastic waste used as feedstock is currently landfilled or used as fuel for cement or electricity production;***
- ✓ ***Low maintenance reduces infrastructure costs. Inert products – do not rot, rust and highly resistant to weathering unlike concrete, wood or steel;***
- ✓ ***Revaluetech process enables products to be made that are cost competitive compared with treated softwood, hardwood and concrete***

# RAIL SLEEPERS & BEARERS AS REPLACEMENT FOR WOOD AND/OR INSTEAD OF CONCRETE

- Composite railroad ties have been in use in USA for the past 15 years.
- Manufactured from recycled mixed plastic waste they offer longer maintenance free service life than either treated soft wood or hardwood
- Unlike wood, concrete or steel they do not rot, rust or suffer from weathering.





# REVALUETECH PROCESS TECHNOLOGY PROVEN – TRIALS SUCCESSFUL ! INITIAL RAIL SLEEPERS GREY, SUBSEQUENTLY BLACK MASTERBATCH ADDED TO AVOID UV DEGRADATION.

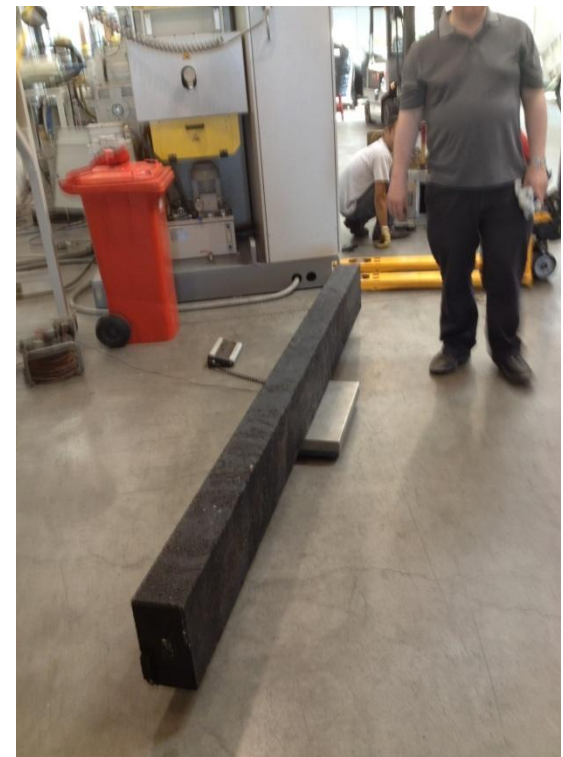
Grey before black masterbatch added



Size:2600x250x130mm



Weight 89kgs.





## RAIL SLEEPERS & BEARERS - WHY?

- ▣ **Physical & environmental performance better than wood sleepers**
- ▣ **Avoids use of carcinogenic creosote treatment of wood sleepers**
- ▣ **Maintenance free, very durable, minimising costly replacement**
- ▣ **Long service life (predicted to be at least 3–4 times more than wood)**
- ▣ **Similar weight to hard wood, but avoids import and destruction of tropical rain forests.**
- ▣ **Products inert, non toxic – and not a food source for animals insects or attract fungal growth.**
- ▣ **May be laid in situ with existing wood sleepers avoiding acoustic and stress problems associated with using concrete in situ with wood.**
- ▣ ***and significantly are PRICE COMPETITIVE !!***

## **Collaborative Project - development programme for the rail sector**

**In order to bring the process development work to fruition we have agreed to collaborate with the Advanced Engineering Composites Group at the University of Sheffield. The intention of this is to:**

- Utilise the knowledge & experience already gained at the University to determine composition formulation of a heavy duty rail sleeper;**
- Manufacture and test a number of rail sleepers in the Advanced Engineering composites laboratory to determine their physical performance;**
- Utilise the formulation once proven to manufacture sufficient numbers of rail sleepers to enable track tests to be carried out with Network Rail and other railway operators in Europe.**

## **Collaborative Project - development programme for the U.K. Environment Agency**

**The effects of climate change have caused considerable damage in various countries across the world. In the U.K. severe weather has resulted in a marked increase in flooding and erosion of the coastline in a number of places. As a result of this Revaluetech is collaborating with the EA to find an acceptable alternative to hardwood presently extensively used in sea and river defence construction.**

- With sustainability being a priority for the EA the use of heavy duty composites will reduce the need to import hardwood and use a maintenance free, longer lasting, environmentally safe alternative , which also reduce the need to landfill finite resource materials.**
- Our knowledge & experience gained in the use of polymer composites made from mixed plastic waste is being used in the design and construction of groynes and other sea and flood defence structures.**

# REVTMENTS FOR LANDSCAPING AND SLOPE ENGINEERING APPLICATIONS



# Highways – road construction & refurbishment

During our initial development phase a number of trials were carried out with civil engineering contractors , local authorities and house builders. Every trial carried out proved to be 100% successful in respect of:

- Kerbing virtually unbreakable unlike brittle concrete kerbs – eliminating replacement and relaying costs. *(NB New build estates typically suffer 60%+ breakages).*
- 60%+ saving in kerb weight overcomes the high mechanical handling costs to meet U.K. Health & Safety Manual Handling Regulations and saves transport costs *(1 truck to every 2 for concrete).*
- Operator friendly – RCS (Respirable Crystalline Silica) ELIMINATED - safe and easily cut. Faster laying time – providing further cost savings.
- Superior physical and environmental performance *(E-Kerbs are inert, highly resistant to chemicals, bacteria, vermin, fungi and weathering)*
- Longer service life compared to concrete *(source AEATechnology – predicted data)*. Kerbs fully recyclable at the end of their long service life.
- 95% saving in carbon emissions compared to the manufacture of concrete

## **Composites Summary - Key facts**

**The Revaluetech Process technology has been proven during trials held with our chosen equipment supplier. It offers 95%+ saving in carbon emissions compared to concrete production**

**Manufacturing process is safe to operate and safe to the environment, no emissions to air, land or water.**

**Example products have been field tested during the past 15 years showing their durability and resistance to weathering**

**The composites are inert, are not a food source for animals, insects, bacteria and do not support fungal growth.**

**Products do not pollute potable water, and offer excellent resistance to damage from sea water**

**Products may be recycled at the end of their extended service life**



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