



Tensar®

Dr Brian Mercer and the Invention of Polymeric Geogrids

ISSMGE Time Capsule Project 2022

Introduction

Here at Tensar, we are proud to submit our contribution towards the International Society for Soil Mechanics & Geotechnical Engineering Time Capsule Project 2022





About the inventor of
polymer geogrids:

Dr Brian Mercer

Dr Brian Mercer – the 'Father' of geogrids



*Dr Brian Mercer OBE
(1927 – 1998)*

Polymer meshes were invented by Dr Brian Mercer, who patented the Netlon process of extruding molten plastic into grids, rather than weaving polymer fibres, in the 1950s. They proved popular in many industries, including civil engineering.

In the 1970's, Dr Mercer invented integral punched and drawn geogrids through what is known as the 'Tensor process'. In 1978 Dr Mercer filed for a patent on his first integral oriented polymeric mesh, which he called Tensor. The name 'geogrids' was given to the pioneer Tensor meshes by Prof Peter Wroth in 1982 in one of his meetings at Cambridge university with Dr Mercer.

Dr Brian Mercer – the 'Father' of geogrids



*Dr Brian Mercer OBE
Portrait painting by Salvador Dali*

As an advocate for innovation, research and development, Dr Mercer bequeathed a large sum of money to the Royal Society in his will. With this funding, they established the Brian Mercer Awards for Innovation in 2001.

Mercer had his portrait painted by surrealist artist Salvador Dali. The portrait shows him as a saint-like figure dressed in a white robe (see left).

Check out these sources to read more about the life and legacy of Dr Brian Mercer.

- [Wikipedia](#)
- [Royal Society Biographical Memoir](#)

Royal Society Biographical Memoir



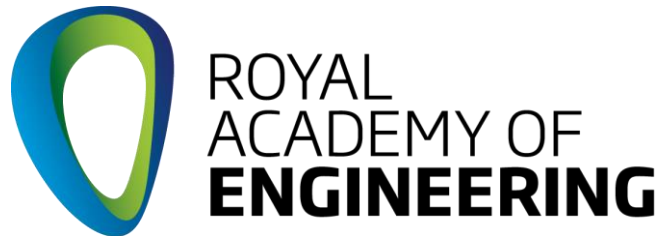
Brian Mercer demonstrating the properties of Netlon to Salvador Dali

"Brian Mercer combined within one man a strong scientific approach with an exceptional imaginative and creative mind."

Industry Recognition



**5 Queens Awards to
Industry**



**MacRobert Award for
Innovation
1984**



**“The Innovation that Revolutionised
Civil Engineering” - 2018**



**Voted top 100 Great British
Innovations**

The Telegraph

**Listed as 11th place in
'Best of British
Technology'**

The Brian Mercer Awards for Innovation

The logo for The Royal Society, featuring the text "THE ROYAL SOCIETY" in white serif font on a red square background.

THE
ROYAL
SOCIETY

As an advocate for innovation, research and development, Dr Mercer bequeathed a large sum of money to the Royal Society in his will. With this funding, the Royal Society established the Brian Mercer Awards for Innovation in 2001.

The objective of this award is to provide funding for individuals or groups to develop an already proven concept through to the creation of a near-market product for commercial exploitation, i.e. to a stage where an approach for venture capital becomes reality.

The scheme has closed and how replaced by the Royal Society Innovation Awards. **[Details are available here.](#)**

Brian Mercer Trust

The trust was established in 1999 according to the wishes of Dr Brian Mercer. It awards grants in three areas, including:

- Prevention and Relief of Human Suffering
- Art in the North West of England
- Causes Local to Blackburn, Lancashire



Brian Mercer
BRIAN MERCER TRUST

More information about the Brian Mercer Trust and the work that they do is available here: www.brianmercetrust.org

The Mercer Lecture Series

The Mercer Lecture series were held in honour of Dr Brian Mercer as he was an enthusiastic inventor and entrepreneur.

The aim of the series was to establish future direction for those involved in the geotechnical, geosynthetic and civil engineering fields.



For all the proceedings from the Mercer Lecture Series, visit:

www.mercerlecture.com/proceedings

Sponsored by:



Tensor[®]

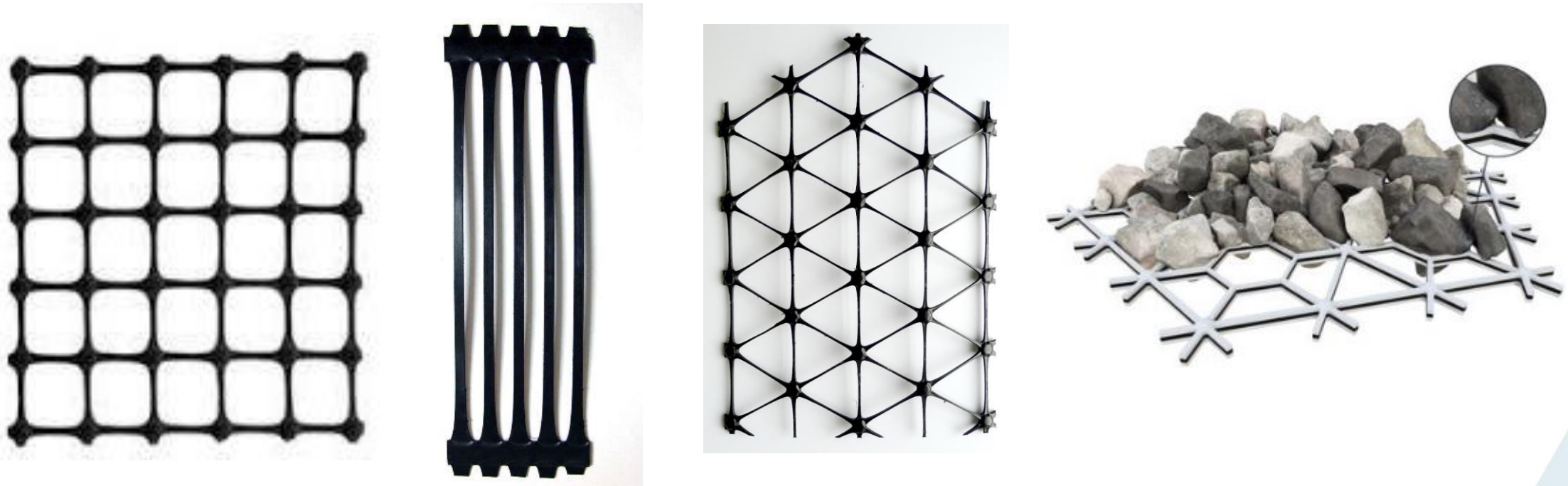


History & Evolution of Geogrids

Historical Background of Geogrids

In 1978 Mercer invented the 'Tensar' process (extruded, punched and stretched HDPE & PP) and in 1980 first engineered 'plastic meshes' were made available to Civil Engineers.

Prof Peter Wroth (Cambridge, 1982): Coined the term 'geogrid'



The World of Netlon 1987 - YouTube

This film describes the Netlon process, which was invented by Dr Brian Mercer.

It also looks into how it was manufactured and gives an insight into the various ways that it was used.

[Click here](#) to watch the YouTube video



Tensor Geogrids 1992 – Archival Film

This Tensor promotional film from 1992 looks at the invention of Tensor geogrids by Dr Brian Mercer for use in civil engineering.

[Click here](#) to watch the archival video on YouTube.



Milestone Geogrid Symposia

- **1984 Polymer Grid Reinforcement Symposium**

The original Polymer Grid Reinforcement symposium, sponsored by the Science and Engineering Research Council and Netlon Ltd (now Tensar International Ltd) was held in London on 22nd – 23rd March 1984. The aim of the 1984 symposium was to discuss the results and present examples of applications worldwide, looking at the development of the properties of polymers to allow them to be used as load bearing structural materials.

- **2009 Jubilee Symposium on Polymer Geogrid Reinforcement**

This symposium was held on the 8th September 2009 at the Institution of Civil Engineers and reviewed the wide body of practical research that continues to this day and also formulated the challenges for new research in order to deepen the understanding of the mechanisms and to deliver further technical advancements.

To access the proceedings of the 1984 & 2009 symposium, [click here](#).

A brief history of Tensar geogrids

The 1970's marked a revolution in the construction of retaining structures and roads, with Tensar's invention of polymeric geogrids.

A geogrid's main function is to mechanically stabilise granular materials, reinforcing soil slopes and retaining walls; providing safe access over soft ground; reducing aggregate layer thickness in pavements and increasing the ground's bearing capacity beneath roads and railways.

Read all about [it here](#) on the Tensar Ground Coffee blog.

The screenshot shows the Tensar Ground Coffee website. At the top, there is a navigation menu with links for 'OUR PRODUCTS', 'SERVICES', 'TENSAR ACADEMY', 'SOFTWARE', 'DOWNLOAD AREA', and 'CONTACT US'. The main content area features an article titled 'A brief history of Tensar geogrids' by Jonathan Cook, dated 05-Dec-2019 04:56:55. The article text states: 'The 1970's marked a revolution in the construction of retaining structures and roads, with Tensar's invention of polymeric geogrids.' Below this, a paragraph explains: 'A geogrid's main function is to mechanically stabilise granular materials, reinforcing soil slopes and retaining walls; providing safe access over soft ground; reducing aggregate layer thickness in pavements and increasing the ground's bearing capacity beneath roads and railways.' A video player is embedded, showing a man speaking in front of a rocky coastline. Below the video, the text reads: 'Dr Brian Mercer: The father of geogrid'. A short paragraph follows: 'Geogrids were invented by Dr Brian Mercer, who patented the Netlon process of extruding molten plastic into grids, rather than weaving polymer fibres, in the 1950s. They proved popular in many industries, including civil engineering.' Below this is a small image of two men with a large geogrid. To the right of the article, there is a sidebar with a 'CMA' award badge (Construction Marketing Awards Winner 2020), a 'Tensar Academy Webinars' section with a 'Watch Here' link, and a list of webinar topics: 'How can wind turbines be even greener?', 'How do you model geogrids in FEA?', and 'Designing road foundations to DMRB-CD225'. At the bottom right, there is a dark blue box with the text 'Want to get updates from Tensar?' and a 'SUBSCRIBE' button.

The beginnings and development of geogrids

As with most great ideas and products that we now take for granted, geogrids began in a small way, and have come a considerable distance to reach the level of acceptance and utilisation we see today.

The Ground Coffee blog on: “Innovative Engineering – The Genesis and Continual Development of Geogrids” tells us more about the beginnings and evolution of geogrids.

Read all about [it here](#) on the Tensar Ground Coffee blog.

The screenshot shows the Tensar Ground Coffee website. At the top, there is a navigation bar with links for 'OUR PRODUCTS', 'SERVICES', 'TENSAR ACADEMY', 'SOFTWARE', 'DOWNLOAD AREA', and 'CONTACT US'. Below this is a dark header with the text 'Tensar International Ground Coffee Blog'. The main content area features the article title 'Innovative Engineering – The Genesis and Continual Development of Geogrids' by Jonathan Cook, dated 17-Jun-2021. The article text begins with 'As with most great ideas and products that we now take for granted, geogrids began in a small way, and have come a considerable distance to reach the level of acceptance and utilisation we see today.' It then discusses the early 1970s, the invention of geogrids by Dr. Mercer, and the introduction of new technology in 1978. At the bottom of the article is a photograph of a long, multi-tiered retaining wall made of concrete blocks, situated on a steep, rocky slope. To the right of the article is a sidebar with a 'CMA WINNER 2020' badge, a 'Tensar Academy Webinars' section, and a 'Want to get updates from Tensar?' subscription form with an email input field and a 'SUBSCRIBE' button.

Timeline of Tensar geogrids

Netlon Ltd was founded by Dr Brian Mercer OBE.



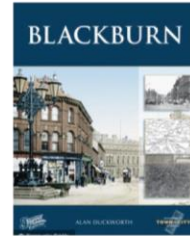
The original biaxial geogrid invented.



First uniaxial geogrid created and first reinforced soil structure.



First geogrid manufacturing plant established in Blackburn, UK.



Tensar TriAx geogrid was launched.



Tensar InterAx geogrid was launched.



1959

1978

1980

1982

2007

2021



The Boeing 707 makes its debut.



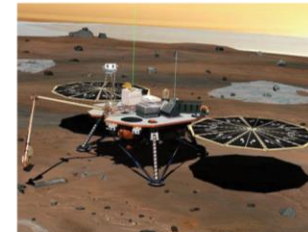
Space Invaders launches craze for computer video games.



The Walkman was the first portable audio player.



First CD player sold in Japan.



The Phoenix Spacecraft is launched toward Mars to study its North Pole.



NASA's Ingenuity helicopter performs the first powered flight on another planet.

Tensor Presents....

TIMES OF CHANGE: GEOSYNTHETICS

We have much better paving equipment now than in 1958 and geosynthetics have been introduced to pavement design by Tensor and others.

Including geogrids, geotextiles, asphalt interlayers and drainage composites.

Our **"Time of Change"** video will tell you all about it.

Tensar InterAx – The latest evolution of geogrids

Twelve global teams and over 10,000 hours of R&D have led to the development of Tensar InterAx geogrid, our highest performing product to date.

It has optimised geometry for maximum confinement of granular fill, creating a more efficient mechanically stabilised layer.

Learn about Tensar's latest **innovation here.**





Use of Geogrids in Civil Engineering

Overview of main applications



Read all about the **range of applications.**

The first polymeric geogrid reinforced soil structure

Railway in Silkstone Quarry – Yorkshire, UK



Tensar uniaxial geogrids were first used in 1980, to build a temporary 2.5m high retaining wall supporting a railway at Newmarket Silkstone Colliery, Yorkshire. The retaining wall was constructed with waste minestone fill material, produced from the surrounding mines, reinforced with geogrids. Performance exceeded all expectations, with no discernible wall deformation throughout its three years design life, despite up to 300t of waste passing over the railway every hour.

Read the [**Technical Paper here.**](#)

Strengthening and expansion of runway

Port Stanley Airport – Falkland Island



Royal Engineers were the first to trust and use Tensar geogrids. One of the first applications of Tensar biaxial geogrid was the extension & repair of the airport landing strip in Port Stanley in the Falkland Islands in 1982 over challenging peaty soils to receive the then new RAF Phantom, which was crucial to securing victory.

View the [**Technical Paper**](#).

Tensor's tallest reinforced soil structure

Dubai Fujairah Freeway – United Arab Emirates



Tensor's tallest reinforced soils walls, that are also amongst the world's highest retaining walls, were constructed to support the new Sheikh Khalifa Highway connecting the port of Fujairah with Dubai. The project involved extensive cut and fill through the mountainous areas of Fujairah in order to form the new 4-lane freeway, utilising the blasted Gabbro generated from the cut slopes reinforced with Tensor geogrids to create reinforced soils embankments up to cumulative height of 60m, to bridge the valleys by replacing the originally proposed viaducts.

Download the [**Technical Paper.**](#)

Tensar InterAx UK 3rd Generation Geogrids



Tensar introduced 3rd generation of stabilisation geogrids, called Tensar InterAx geogrid in 2021.

Freight Force Working Platform

Tensar InterAx Installation - Key Benefits

- Safe access to poor ground by installing Tensar MSL incorporating Tensar InterAx NX850 geogrid
- Working platform supported Juntann piling rig exerting pressures of up to 200kPa
- 14% saving of overall project cost
- 20% time saving thanks to the reduction in thickness of the platform

[Click here](#) to download the case study.



For more information, visit
www.tensar.co.uk

Tensar®