



# NATIONAL MINERALS WEEK 2016

## How Minerals Keep Us Moving



# IQ

The Institute  
of Quarrying

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[www.quarrying.org](http://www.quarrying.org)



## What's it all about?

Quarrying is often regarded as an ancient art that has little relevance to today's modern environment. It is almost anachronistic to suggest that the high speed railways, multi-lane motorways and super jumbo jets that help us commute to work or enjoy our holidays just wouldn't exist without minerals being extracted from the ground.

Lets consider for a moment the amount of metal required to fly us through the air, sail from port to port, to keep trains on track and just allow us to drive to wherever we want to go.

From the bodywork of the car through to the jet engines and propellers that power the most sophisticated aircraft and sea vessels, those metals have been produced from minerals that have been quarried. Aluminium from **bauxite** and alloys and super alloys from **beryllium, chromium, cobalt, titanium** and **vanadium** all produce iron and steel of different strengths and resistance to suit the particular transport applications they are being put to.

### Definitions:

**Alloy** - a metal made by combining two or more metallic elements, especially to give greater strength or resistance to corrosion.

**Super Alloy** – a high performance alloy that has excellent mechanical strength, is resistant to corrosion or oxidation, is stable and is less likely to degrade over time.

As well as providing the metal for the frames, axles, gearboxes, exhausts and many of the mechanical moving parts for all of these modes of transport, minerals also play an important part in providing the surfaces that they travel on and the energy they consume.

**Aggregates** are quarried to provide the ballast that provides the support for railway tracks as well as the tarmac for airport runways and the roads we drive on and **Halite** makes them safe for use in the winter by keeping our roads clear from snow and ice.

Mineral extraction in the UK has a £15 billion turnover and 16% of the whole economy can be directly attributable to minerals\*. Whilst identifying the total value of minerals to the transport sector is a challenging task, we do know that:

- Roads, railways and tunnels generates £18.2 billion in gross value add (GVA) to the economy
- Motor vehicles generates £11.1 billion GVA
- Other transport equipment generates £7.4 billion GVA

\*Figures from CBI The UK Minerals Extraction Industry report February 2016, prepared by Minerals Products Association (MPA)  
[http://www.mineralproducts.org/documents/CBI\\_UK\\_Mineral\\_Extraction\\_Industry\\_2016\\_2.pdf](http://www.mineralproducts.org/documents/CBI_UK_Mineral_Extraction_Industry_2016_2.pdf)

The use of minerals to keep us moving has also been impacted by our growing awareness of environmental issues. For example, **platinum** is used in the catalytic converters found in buses, trucks and cars to convert the noxious engine emissions into less harmful waste. And the increasing use of electric vehicles has seen a rise in the demand for **graphite**, the crystal form of carbon. Graphite is used to construct the anode of batteries to help control the flow of electrons into the device the battery is being used in.

Without minerals in our life, we would know very little about the world we live in. Our ability to travel for work and pleasure would be severely restricted without minerals contributing to everything from the humble bicycle through to supersonic jets. Being able to go out and explore the world, meet new people and enjoy new experiences are all facilitated by the contribution minerals make to our built environment.

## Key Mineral Facts

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### Aggregates



Includes sand, gravel and crushed stone that may be used in their natural state or altered through crushing, screening and washing. In 2013 the UK produced 164 million tonnes of aggregates.

### Bauxite



A reddish clay rock that contains aluminium oxide compounds. The top bauxite producing countries include Australia, China, Brazil, Indonesia and Guinea.

### Beryllium



Often found in igneous rocks, it is used to make light, strong alloys. The USA is the dominant source for beryllium responsible for over 85% of the world's production. Beryllium is also found in the precious gemstones aquamarine and emeralds.

### Chromium



Because chromium is resistant to corrosion and produces a hard metal, it is used for super alloys in the production of stainless and heat resistant steel. Leading producing countries include South Africa, Kazakhstan, India and Turkey.

### Cobalt



The Democratic Republic of Congo is the dominant world producer of cobalt supplying 68% of the world's total supply. Cobalt is used as a super alloy for aircraft gas turbine engines.

### Graphite



Graphite is a crystallised form of carbon created in metamorphic rocks and found close to the earth surface. The world's major producers are China, India, Brazil and North Korea.

### Halite



Commonly known as rock salt and mixed with sand to improve traction during snow and icy periods. Worldwide around 225 million metric tons of salt is produced in more than 100 countries. Large producers include China, USA, India & Germany.

### Molybdenum



Has a high melting point that makes it useful in applications involving intense heat (such as military, aircraft and industrial motors). The leading world producers are China, USA, Chile and Peru.

### Platinum



There are actually six minerals that make up the platinum group: platinum, palladium, rhodium, iridium, osmium and ruthenium. The key country producers are South Africa and Russia.

### Titanium



The two most useful properties of titanium are its corrosion resistance and having the highest strength-to-density ratio of any metallic element. Country producers include Canada, South Africa, Australia, Vietnam and China.

### Vanadium



An extremely important component in modern steel making because of its particular properties making it resistant to corrosion. Found in over 65 different minerals, the leading world country producers include China, South Africa and Russia.