



HANSON'S RIBBLESDALE WORKS, CLITHEREOE

BACKGROUND INFORMATION QUESTIONS ANSWERS



BACKGROUND INFORMATION



THE COMPANY

The cement works are in Clitheroe.

Hanson Cement owns the cement works.

The cement works are called Ribblesdale Works.

There are now 101 in the workforce.

This is more than double the number at school.

PRODUCTS

Cement is used mainly for buildings, sea defences and road building.

Cement is taken to the North of England and to Scotland.

It is transported to these places by trains and lorries.

Cement is made from powdered limestone and mixed with clay and fly ash and heated to make clinker.

The clinker is ground to a fine grey powder.

The cement is put into 25 kg bags or loaded onto trains.



THE CEMENT WORKS

There are four processes used to make cement? The limestone rock is powdered fed, into a rotary kiln, cooled by air and then ground with gypsum.

The cement is OPC which is Ordinary Portland Cement. It was first made in Leeds.

Coal used to be used to heat the kilns but now they use chopped tyres, ground bones and animal residues.

The temperature of the kiln reaches 1500 degrees Celsius.

Heating limestone produces sulphur dioxide which causes acid rain and global warming. Scrubbers have been installed in the chimneys to remove the sulphur dioxide preventing it from getting into the atmosphere.

There are many computer screens in the control room. They control the machinery, monitor exhaust gases and the rate of production.

Colours are used to alert the operators to the efficiency of the cement making processes. Green for everything under control, amber for prepare to take action and red for problems.

Clinker is ground from round lumps by heavy metal balls to a fine grey powder. Cement is then put into bags weighing 25 kg or poured into the trains.

One trainload leaves every day either to the North of England or Scotland and 60 bags are filled each minute.

THE QUARRY

Crushed rock is extracted from Bankfield Quarry to make the cement. It is ideal for making cement because the quarry is limestone and clay with some shale.

The adjacent Bellman Quarry has purer rock and was used for making quicklime.

Before the rock was quarried from under the soil the land was a golf course.

When quarrying ceases in approximately 40 years the ground will be landscaped to form a leisure park with trees, beaches and a lake.

Grass and many trees have already been planted to reduce the harshness of the quarried rock, prepare for the restoration and also to reduce the amount of dust.

Cliffs, grass and trees create a wonderful habitat for wildlife. There are lots of birds and animals in the quarry, including, foxes, rabbits and deer, peregrine falcons, ravens and owls.

The lorries, dumpers, excavators and drills are large and heavy. They will have flashing lights and sirens to alert workmen when they are moving.

Working quarries can be dangerous places so strict health and safety is in place with all workers wearing high visibility jackets or vests, hard hats and eye protection.

Blasts take place several times a week to break up the rock. The vibration can be felt over a large distance. Workers have to keep well away from the blast area and sirens are used to signal the start and end of the blast.

THE QUARRYING SEQUENCE

The following describes the sequence of activities in obtaining rock from a limestone quarry.

1. Drilling. Holes are drilled in area of rock face. The holes are filled with explosives.
2. Explosion. Following a sequence of warning signals the explosive is detonated.
3. Excavation. When a siren indicates that the detonation is safely complete a huge mechanical excavator lifts the pieces of broken rock into a dumper truck.
4. Transportation. The huge dumper truck carries a massive weight of rock and tips it into the crushing machinery.
5. Crushing. The rocks are crushed in machinery and carried on mechanical conveyors to sieves.
6. Sieving. The rock is sieved into different sizes and taken to a store.
7. Transportation. The quarry products are transported away from the quarry by road and rail to the user.

The quarried material is taken away and used in the manufacture of building materials (E.g. cement, concrete, asphalt.) and other products (E.g. toothpaste, farm soil improver, cleaning materials, treating and cleaning water etc.).

THE GEOLOGY

The Limestone rock was laid down about 350 million years ago when the area was covered by warm tropical seas full of sea creatures.

Limestone is a sedimentary rock formed from sand and the skeletons of sea creatures that have settled on the ocean floor and compressed over millions of years.

Limestone is made up mainly of calcium carbonate.

Pure limestone is white.

The rocks are noted for their rich and varied fossil remains.

When limestone is heated by geological processes it re-crystallises, traces of fossil remains are obliterated to form marble. Marble is therefore a metamorphic rock. Other metamorphic rocks are slate and schists.

Hard limestone and marble can be polished for decorative use.

Igneous rocks were formed by magma from the molten interior of the earth. When magma erupts it cools to form volcanic landforms. Examples are granite and basalt.

Other sedimentary rocks include sandstone, chalk and clay.

HEALTH AND SAFETY

Safety is a key concern at all working quarries. A risk assessment is completed for all procedures.

Quarry workers are protected in many ways. Some of these protection and the safety procedures are highlighted in the *Virtual Quarry* - www.virtualquarry.co.uk

Safety Protection

In the virtual quarry all workers wear high visibility appropriate clothing with hard hat skull protection. All workers are required to report their presence to a supervisor once inside the quarry boundary.

Safety Procedures at blasting

In the hard rock *Virtual Quarry* rock blasting takes place at clearly designated times. The blasting supervisor gives a sound (siren) and visual (red flag) warning at a fixed time before the actual blast. All other quarry workers have to leave the blast area and report to a safe area once the warning is given. The blasting supervisor checks that the blast area is clear before sheltering in a safe area.

The blast is detonated and the supervisor returns to check that all explosives are detonated before sounding the "all clear." Only after the "all clear" can other quarry workers return to the quarry face.

Safety features in quarry machinery

Much quarry machinery is designed to handle large and heavy loads. Vehicles are designed for strength, good all round visibility and cab protection for the driver. The vehicles have high visibility flashing warning lights and an automatic sound warning signal when in reverse gear.

It is important to control the dust in the air both on the quarry site and on nearby roads. Quarry roadways are sprayed to reduce air borne dust pollution which could be a health hazard for quarry workers. Public roadways are sprayed and cleaned.

THE PEOPLE

Mick, Paul and Sam showed us around the quarry and cement works.

Mick and Paul used to work in the quarry in the control room and the lab. They are now retired. They usually show 10 to 15 groups a year around the quarry and cement works.

Although there are 101 people working in the cement works there was only one of a small team of 4 in the control room to monitor all the cement production. Production is 24 hours day and night and so they work 12 hour shifts. There is only one woman working in cement production. The majority of the work force are men.

Some years ago there were 300 people working there.

Sam is the Quarry Manager and is responsible for making sure that cement is made up of the correct proportion of materials at every stage in the process.

What can you remember about the quarry and cement works and the people you met?

Do you think that the people you met enjoy working there?

Would you like to work in the quarry or cement works?

If so what job would you like to do?

Mick and Paul will be coming to School on Tuesday. This is a chance to get some facts and figures.

You will be able to ask them questions about the cement works and the quarry and what it was like to work there.

SOME QUESTIONS



THE COMPANY

1. Where are the cement works?

2. What is the name of the company at the cement works?

3. What is the name of the cement works?

4. How many people work at the cement works?

5. How many children and teachers are there in your school?

6. Where does the rock for the cement come from?

PRODUCTS

1. Cement is used mainly for _____ ,
_____ defences and _____ building.
2. Cement is taken to the _____ of _____
and to _____ .
3. It is transported to these places
by _____ .
4. Cement is made from powdered
_____ and mixed with
_____ and _____ and heated to make
_____ .
5. The clinker is ground to a fine _____ powder.
6. The cement is put into _____ or loaded onto trains.

THE CEMENT WORKS

1. What are the four processes used to make cement?
2. What is OPC?
3. What fuels are used to heat the kiln?
4. What temperature does the kiln reach?
5. What is given off when limestone is heated?
6. How is this gas prevented from getting into the atmosphere?
7. What are the key tasks of the computers in the control room?
8. What colours are used to alert the operators?
9. How is the fine grey powder made?
10. What happens in the packaging shed?
11. How often do the trains run?
12. How many bags are filled each minute?

THE QUARRY

1. Rock for the cement is taken from _ _ _ _ _ Quarry.
2. The rock is a mix of _ _ _ _ _ , _ _ _ _ _ and shale.
3. The land used to be a _ _ _ _ _ .
4. Quarrying will probably cease in _ _ years from now.
5. The quarry will then become a _ _ _ _ _
_ _ _ _ _ .
6. There are lots of _ _ _ _ _ in the quarry.
7. Workers have seen a pair of _ _ _ _ _ in the quarry.
8. There are _ _ _ _ _ , _ _ _ _ _ and _ _ _ _ _ in the quarry.
9. The big dumpers and lorries have _ _ _ _ _ lights and sirens.
10. Quarry workers wear high vis _ _ _ _ _ , _ _ _ _ _ and _ _
_ protection.

THE QUARRY

1. Where does the rock come from for making the cement?
2. Why is it ideal for making cement?
3. What is the rock like in Bellman Quarry?
4. What was there before the quarry?
5. How much longer have they permission to quarry?
6. What will happen to the land when quarrying stops?
7. Why have they planted trees and grass?
8. What animals and birds live in the quarry?
9. What vehicles are there in the quarry?
10. Describe the protective clothes worn by quarry workers and visitors.
11. How often do blasts take place?
12. Why are there flashing lights and sirens?
13. What are the 7 stages in the quarrying process?

THE GEOLOGY

1. How old is the Limestone?
2. What was the land like when the limestone was laid down?
3. What is limestone made of?
4. What is the mineral?
5. What colour is pure limestone?
6. What type of rock is limestone?
7. What are rocks called that are formed from the magma?
8. What are rocks that have been changed called?
9. List two of each type of rock

Write a sentence for each of your answers.

THE GEOLOGY

1. The rock was laid down about _____ m _____ years ago.
2. The land was covered by warm tropical _____ full of sea creatures.
3. Limestone is a _____ rock.
4. It was formed from _____ and the skeletons of sea creatures that have settled on the _____ floor and compressed over millions of years.
5. Pure limestone is _____ in colour.
6. In the rocks you can see the _____ remains of sea creatures.
7. Other sedimentary rocks include sandstone, _____ and clay.
8. When limestone is heated by geological processes it re-crystallises to form _____.
9. Marble is a _____ rock.
10. Other metamorphic rocks are _____ and schists.
11. Igneous rocks were formed by _____ from the molten interior of the earth.
When magma erupts it cools to form volcanic landforms.
12. Examples are _____ and basalt



SOME ANSWERS



THE COMPANY

1. Clitheroe
2. Hanson Cement
3. Ribblesdale Works
4. 101
5. 50 (?)
6. Lanehead Quarry

PRODUCTS

1. Buildings, sea, road
2. North England Scotland
3. Trains and lorries
4. Limestone, clay, fly ash
5. Grey
6. 25kg bags

CEMENT WORKS

1.
 - a. The limestone rock is powdered
 - b. Fed into a rotary kiln
 - c. cooled by air
 - d. ground with gypsum
2. Ordinary Portland Cement
3. Coal used to be used to heat the kilns but now they use chopped tyres, ground bones and animal residues.
4. 1500 degrees Celsius
5. Heating limestone produces sulphur dioxide which causes acid rain and global warming.
6. Scrubbers have been installed in the chimneys to remove the sulphur dioxide.
7. There are many computer screens in the control room.
They control the machinery, monitor exhaust gases and the rate of production.
8. Green for everything under control, amber for prepare to take action and red for problems.
9. Clinker is ground from round lumps by heavy metal balls to a fine grey powder.
10. Cement is then put into bags weighing 25 kg or poured into the trains.
11. One trainload leaves every day either to the North of England or Scotland.0
12. 60 bags are filled each minute.

Quarry Arts 2015

