The use of fossil fuels engineering essay

Engineering

Student ID: 0313647Section: 2Topic: petroleumTable of contentPetroleumhttp://www. petroleum. co. uk/images/petroleum. jpgPetroleum in Greek : πέτρα (rock) and Latin : oleum (oil). Petroleum is a flammable liquid which consist of high amount of hydrocarbon of many molecular weights and organic compounds. Petroleum is normally found in geologic formation beneath the Earth's surfaces. The name petroleum usually means unprocessed crude oils and petroleum products that are made up of refined crude oil. Fossil fuels is formed when large amount of organism, usually algae and zooplankton, are buried underground beneath sedimentary rock and undergo intense heating and pressure. Oil drilling is a process to extract petroleum from underground. Before oil drilling, a study of structural geology (at the reservoir scale), sedimentary basin analysis, reservoir characterization (porosity and permeable structures) is made. Through the process, petroleum will be purify and separated, into large number of consumer products, from petrol and kerosene to asphalt and chemical reagents to make plastics and pharmaceuticals. Petroleum is used in manufacturing a wide variety of materials, it is estimated that the world consumes about 88 million barrels each day. The use of fossil fuels such as petroleum can have a negative impact on Earth's biosphere; it can cause pollution and global warming due to the combustion of petroleum. Through the combustion of petroleum, pollutants and greenhouse gases are released and cause damages to the ecosystems. The depletion of the earth's resources of oil, cause the society dependent on it, this concept is known as peak oil. Petroleum can be clear, green or black and may be thick like tar or thin like gasoline. In 1859, Edwin Drake sank the first known oil well, it happened in Pennsylvania. Since this time, the oil and petroleum production

figure grew exponentially. The primary use of petroleum was a lighting fuel, and we can get kerosene when it is distilled. In 1882, the construction of electricity plant cause the demand of kerosene began to drop. However, Henry Ford had shown the world that the automobile would be the best form of transport, and gasoline began to be in high demand. During World War 1, the production of petroleum increases tremendously due to the high demands of the war. Now, petroleum is also viewed as a valuable commodity, trade around the world in the same way as gold and diamonds. Petroleum is also a major part of the chemical makeup of many plastics and synthetics. Petroleum is a mixture of a very large number of different hydrocarbons; the most commonly found molecules are alkanes (linear or branched), cycloalkanes, aromatic hydrocarbons, or more complicated chemicals like asphaltenes. each petroleum have unique mix of molecules, which will define its physical and chemical properties, like its color and viscosity. Alkanes, also known as paraffin, are saturated hydrocarbon with straight or branched chains which contain only carbon and hydrogen and have a general formula of CnH2n+2. The alkanes from pentane (C5H12) to octane (C8H18) are refined into petrol, the ones from nonane (C9H20) to hexadecane (C16H34) into diesel fuel, kerosene and jet fuel. Alkanes with more than 16 carbon atoms can be refined into fuel oil and lubricating oil. Paraffin wax is an alkane with an alkane with approximately 25 carbons atoms, while asphalt has 35 and above, these alkenes usually cracked by modern refineries into more valuable products. . The shortest molecules, with just a few carbon atoms are normally exist in gaseous form at room temperature. These are the petroleum gases. Depending on demand and the cost of recovery, these gases are either being combust or sold as liquefied

petroleum gas under pressure, or used to power the refinery’s own burners. During the winter, butane (C4H10) is mixed into the petrol pool at high rates, because its high vapor pressure assists with cold start. Liquified under pressure slightly above atmospheric, it is best known for powering cigarette lighters, but it is also a main fuel source for many developing countries. Propane can be liquefied under modest pressure, and it can be used to replace petroleum, from cooking to heating and transportation. The cycloalkenes, also known as naphthenes, are saturated hydrocarbons which have one or more carbon rings to which hydrogen atoms are attached according to formula CnH2n. cycloalkanes have same properties to alkanes but have higher boiling points. The aromatic hydrocarbons are unsaturated hydrocarbons which have one or more carbon rings called benzene rings, they tend to produce more soot while burning, but many have sweet aroma. Some are carcinogenic (agent that can cause cancer). these different molecules are separated by fractional distillation at an oil refinery to produce petrol, jet fuel, kerosene, and other hydrocarbons. For example, one of the most commonly used element is the 2, 2, 4-trimethylpentane (isooctane), widely used petrol, has a chemical formula of C8H18 and reacts with oxygen exothermically. 2 C8H18(l) + 25 O2(g) → 16 CO2(g) + 18 H2O(g) (" H = −10. 86 MJ/mol of octane)The amount of different type of molecules in an oil sample can be determined in the laboratory. These molecules are then extracted out and separated in a gas chromatography; it is then being determined by the suitable detector. Some of the examples of are the flame detector or a mass spectrometer. Due to the large amount of extraction of hydrocarbon within the oil, many hydrocarbons cannot be determined by the traditional gas chromatograph. These unresolved complex mixtures (UCM) of

hydrocarbons are visible when examining the weathered oils and extracts from tissues of organism exposed to oil. Incomplete combustion of petroleum will give out toxic byproducts like carbon monoxide and nitrogen oxides which causes photochemical smog. The efficiency of the combustion of the petroleum to power a car is 25% -30%. The remaining 70%-75% are rejected as heat and toxic byproducts. Some of the energy produced by the combustion is turn into friction, noise, air turbulence, and work use to turn the engine equipment. The composition of petroleumElementPercentage rangeCarbon83 &#65533;" 87%Hydrogen0 &#65533;" 14%Nitrogen0. 1 &#65533;" 2%Oxygen0. 05 &#65533;" 1. 5%Sulfur0. 05- 6. 00%Metals <0. 1%History of petroleumPetroleum have been use since the ancient times, it has been controlling the economy and politics. It also affects the technologies. Without petroleum, we will be using coal to power our transportation. Coal powered transportation are slow and not efficient. The petroleum become more important when internal combustion engine are invented. Petroleum is also important to the industrial organic chemistry, particularly at producing plastics, fertilizers, solvents, adhesives (pastes and cement) and pesticides. According to Herodotus and Diodorus Siculus, more than 4000 years ago, the asphalt was used in the walls and towers of Babylon, there were oil pits near Ardericca (near Babylon), and a pitch spring on Zacynthus. Great quantities of it were found on the banks of the river issue, one of the tributariesof the Euphrates. In the ancient Persian tablet, petroleum can only be used by the upper class of their society. In 347 AD, the petroleum is produced from bamboo drilling wells in China. The British explorer have done a documentary in Yenangyaung that about hundreds of hand-dug wells were under production. The myth state that the oil fields at Yenangyaung, the oil fields are controlled

by 24 families. In the 1840s, James Young from Scotland has invent the process to distill kerosene from petroleum and Ignacy Lukasiewicz were one of the first person to build the refinery. This make the whale oil to be easily accessed. These makes the demands of petroleum increases tremendously. Edwin Drake’s 1859 well near Titusville, Pennsylvania, is considered as one of the first modern well because the well is drilled not dug, and it uses steam engine. In the 1848, a group directed by the Major Alexeyev of the Bakinskii Corps of Mining Engineers hand-drilled a well in the Baku region. Some of the wells in West Virginia are drilled as the same year as the Drake’s well. In 1853, an early commercial well is hand-dug in Poland. While in 1875, another commercials well is dug up nearby Romania. At around the same time the world’s first, small, oil refinery was constructed at Jaslo in Poland. After some time, a bigger oil refinery is constructed at Ploiesti in Romania. Romania I s the first country to have its annual crude oil output officially recorded in the international statistics : 275 tonnes in 1857. The first oil commercial well in Canada became operational in 1858 at Oils Springs, Ontario. In the 1855 to 1858, a businessman named James Miler Williams had dug several well before he discover a rich reserve of oil four meters below the ground. By the year 1860, Williams have extracted 2 million liters of crude oil due to the high demands of kerosene oil lamps. Some of the people claims that Williams well’s was one of the first in North America because the different in years is only one. The discovery of this oil spring has given hundreds of people jobs. In 1862, local driller Shaw has discover a new drilling method which reached the depth of 62 meters and this advanced drilling method has made the oil production increases. In January 16 1862, an explosion of natural gas in Canada has caused the oil to gush out and this made the production double

its amount. This amount has been measured and calculated by the experts. They state that it can produce up to 3000 barrels of oil daily. By the end of the 19th century, the Russians especially the Branobel company of Azerbaijan, produces the most petroleum.-Geological formationhttp://discoverfossils. com/education/images/GeoForms-Sm2. jpgA formation consists of a certain number of rock strata (a layer of rocks and soil) that have a comparable lithology (the gross physical character of a rock or a rock formation), facies (A rock or stratified body distinguished from others by its appearance or composition) or other similar properties.-Sedimentary rockThe formation of sedimentary rock is called “ lithification”. Sedimentary rocks are divided into two classes, detrital sedimentary rocks and chemical sedimentary rocks. Sedimentary rocks make up of 5% of the earth but majority of the rock surfaces are sedimentary. Around 75% of the rock surfaces are sedimentary rocks.-Detrital sedimentary rocksDetrital sedimentary rocks are those for which the materials have been transported as solid particles.-Chemical sedimentary rockchemical sedimentary rock derive from materials that is carried in solution to lakes and seas. If the precipitate is formed, limestone will be produced. Fossil fuelFossil fuel is formed by natural process called anaerobic decomposition of buried dead organisms. The forming of fossil fuel is typically millions of years. It contains high percentage of carbon and includes coal, petroleum, and natural gas. They are range from volatile materials to nonvolatile materials. Volatile materials have low carbon: hydrogen ratios like methane, while volatile materials composed of almost pure carbon such as coal. Estimation have been made by the Energy Information Administration showed that in 2007, the primary sources of energy consisted of petroleum (36. 0%), coal (27.

4%), natural gas (23. 0%) which sum up to 86. 4% of fossil fuels used as the primary energy consumption in the world. Non-fossil sources included hydroelectric (6. 3%), nuclear (8. 5%), and others such as geothermal, solar, tidal, wind, wood and waste (0. 9%). The world consumption on fossil fuels grows about 2. 3% per year. The production and use of fossil fuel increase the environmental concerns. The burning of fossil fuels produces around 21. 3 billion tonnes of carbon dioxide (CO_2) per year, but the natural processes can only absorb half of the amount, so there is a net increase of 10. 65 billion tonnes of atmospheric carbon dioxide per year (one tonne of atmospheric carbon is equivalent to 44/12 or 3. 7 tonnes of carbon dioxide). Carbon dioxide is one of the greenhouse gases