Zoom 200828

Effect of dust-settlements on glass covered concentrating solar collectors in the Atacama desert.– **Elias Forsgren**
As of today 189 countries has signed the Paris agreement which states that the mean temperature of the world should not increase with more than 2$\degree$C when compared to pre industrial levels. This causes a great shift in the energy sectors and the hunt for newer and better renewable sources continues. A such source is solar heat, which can be harvested with concentrating solar collectors. Absolicon solar collectors in Härnösand, produces a concentrating solar collector where the incident light passes though a protective glass cover and then is reflected and concentrated into a eating tube where the heat is transferred away. \\ \indent The place on earth that get the most light per year is in northern Chile in the Atacama dessert, which then becomes a obvious candidate for solar heating in their mining industries if it were not the lack of rainfall and the high amounts of dust in the area. \\ \\ In this rapport the effect of dust accumulations on the transmittance of the protective glass covers has been explored, such as the settlement rate between different angled glass surfaces were compared to rotating glass covers. Together with other effects of the dust present in Chile has such as cementation, where the dust acts as cements and stick to the surface after being moisturised. \\ \\ It was found that the rotating solar collectors should experience a lesser dust accumulation rate than that of the stationary solar collectors with the same glass cover placed in a 45$\degree$ angle, and that the dust accumulated could experience cementation after only a few wet/dry cycles which is still a cause for the solar collectors to be regularly cleaned before this could happen.

Advanced Modelling and Energy Efficiency Prediction for Road Vehicles – **Erik Nordström**
This thesis acts as a first real world case-study of road transport operations that use driver and vehicle independent operating cycles. It is argued that a mathematical representation of relevant transport operations would have a predicted measure that coincides better with the actual measure from the real world operation, compared to today's certification tools that use a conventional representation. The representation of operations treated in this thesis is called Operating Cycle-representation and has been used to fully describe three carefully picked transport missions from a case-study truck. A large number of cycles have been generated from stochastic analysis in order to create a representative cycle of the vehicle usage. The Operating Cycle-representation allowed for fair comparison between vehicle designs and ultimately manifested a vehicle composition that reduced the fuel consumption by nearly 10% for the same kind of transport operations.

Simulation Study of Charging of EV-Fleets in Underground Mining – **Felix Gustavsson**
Due to an increasing concern of the introduction of greenhouse gas (GHG) regulations in many jurisdictions, the underground mining industry is in high demand to tackle climate change through innovative measures. In order to stay competitive, cope with rising energy costs and GHG regulations, mining companies will have to consider the alternative to go fully electric. As underground mines progress through time they are becoming deeper and deeper, resulting in longer haulage distances and thus an increasing energy demand. The research in this thesis was conducted to analyze and develop a simulation tool to investigate the replacement of conventional diesel haulage trucks with battery electric trucks that include a fast-charging capability in an underground mine environment. The results show that there is a major difference in the achievable production rates depending on the mine topography. Furthermore, the developed tool could aid in decision making and provide a good frame of reference of the feasibility of replacing an existing diesel operation by a battery electric one.

Geometry measurements using a smartphone – **Joakim Wiklund**
Quality assurance is an important part of many industrial processes that involves different methods of determining the quality of a product. One of these methods is deflectometry, a method that uses a screen to show patterns and a camera to capture the reflection of these patterns through a specular object which is being measured. The goal and end result of these measurements is a height profile of the objects surface. While there are many ways of performing deflectometry through using different types of patterns and setups, this project focuses on using only a single smartphone to capture all data required for measurements. This involves showing a sequence of patterns on the smartphones display and using its front-facing camera to capture the reflection through the specular object. The patterns chosen for this purpose are binary checkerboard patterns that are simple enough for the camera to capture in a good way and efficient enough to perform the calculations in a reasonable time frame. Using this method, the ability of a smartphone to perform deflectometric measurements was evaluated by testing on several different types of mirrors as well as on a real car body. The method can produce results that closely replicate the real world object and can calculate quantities that are used to measure the quality of car assembly. The method can handle a large variety of reflective objects at varying distances and form while only requiring some known parameters of the smartphone used in testing.