SYNOPSIS ON AXLE LENGTH SHIFTER MECHANISM

The topic deals with design and manufacturing of a hand truck, which can easily change it axle length manually .The uses of this special vehicle are in the frequent lift of goods such as books for library, medicines for hospital, regular goods for any technical and non technical institute or transportation of any toxic material for industries, carry things and crops in plantation and give freedom to turn on any type of path formation. This topic considers a locomotive bogie running on a straight track and presents pattern diversity and bifurcation characteristics of its hunting behaviors at forward speeds higher than the hunting critical speed. Sections describing the cycle characteristic and wheel-rail impacts of the bogie system are defined according to the geometric structure of phase space of the dynamical system for carrying out multi-target and multi-parameter co-simulation analysis. The influences of dynamical parameters of the locomotive bogie on the wheel–rail impacts are studied and some important features of hunting behaviors in the presence of the flange contact nonlinearity are found. A series of grazing bifurcations induce the pattern diversity of hunting behaviors. The impacts of the middle and trailing wheel sets on the rail fall behind that of the leading wheel set, and the impact lag of the hunting motion of the middle wheel set is the most obvious of the three wheel sets. The top branch of impact velocity bifurcation diagram of period 1 hunting motion of the trailing wheel set is slightly lower than those of the leading and middle wheel sets. The instability speed of period 1 hunting-impact motion of the bogie system with worn wheel sets is lower than that with new wheel sets and the impact velocities of the worn wheel sets on the rail become smaller. A method of reasonable matching of primary suspension parameters, which brings about the substantial increase of the instability speed of periodic hunting behavior in the presence of the flange forces, is presented and the matching effect is verified by bifurcation diagrams of impact velocities of the new and worn leading wheel sets versus the forward speed.

SYNOPSIS ON FLUE GAS DE-SULPHURIZATION TECHNOLOGY

Flue gas desulphurization (FGD) is considered as the most effective option for reducing Sulphur Di-Oxide emission from thermal power plants. It is ver4y important to select an efficient and economical FGD technology. In this project various FGD technologies are introduced and their technical problems and features are analyzed. The main objective of the project is to obtain a comprehensive evaluation index based on which a particular FGD technology is selected.

Environmental pollution, which highly influences the quality of human life, is nowadays a problem all around the world. One of the biggest sources of pollution comes from the combustion of coal, which can potentially liberate huge amounts of SO_2, NO_x, particulates, and heavy metals (such as mercury, arsenic and chromium) to the atmosphere. All of those pollutants are damaging to human health and to the environment. Coal can be used in a variety of industrial process, but is most commonly used in electricity and heat production at coal-fired power plants. The largest amounts of coal consumption in the power sector take places in the USA, China, Russia and India. Poland, where more than 83% of electricity production comes from conventional power plants, is one of the biggest coal consumers in Europe. All power units in Poland are equipped with some air pollution control devices, especially electrostatic precipitators (ESPs) and flue gas desulphurization (FGD) scrubbers. Nowadays they are modernized or exchanged, because of the EUs Directives, which requires reducing SO_2, NO_x and particulate matter (PM) two-to-three times compared to existing levels. New technolgies for controlling NO_x emission, mainly selective catalytic reduction (SCR), are installed in Polish power plants too. Nevertheless, these solutions do not sufficiently protect against emission of heavy metals to the atmosphere. Fossil fuel combustion is responsible for 24% of global anthropogenic emissions of mercury, which is highly toxic, especially to the nervous system of developing fetuses and young children. This the reason why many international governments, agencies, and researchers have worked together to take actions to reduce mercury emissions from various sources .Technologies that show promise to control mercury emissions include activated carbon injection (ACI) and co-benefit application of an SCR unit and a wet FGD scrubber. Due to the competition between mercury and sulfur trioxide (SO_3) for active sites, ACI is most appropriate for low sulfur containing coals and is in widespread commercial use in the USA. The ACI option can, however, increase operation costs because the presence of activated carbon in the fly ash can render it less attractive as a construction material (*e.g.*, as concrete admixture).

For co-benefit technologies utilizing existing wet scrubber pollutant control devices, the presence of an SCR unit (used for NO_X control) is likely necessary to make this option attractive. Because wet flue gas desulfurization (WFGD) systems are already installed at many coal-fired power plants, utilizing those scrubbers to also capture mercury seems an obvious and rational choice. However, WFGD cannot directly scrub elemental mercury vapor (Hg^0) efficiently, so it is necessary to find a cost-effective method to convert the Hg^0 to an oxidized or even a particle-bound form before entering the WFGD system. Conversion of Hg^0 to Hg^{2+} or particulate-bound mercury can be accomplished by heterogeneous catalysis or homogeneous gas phase oxidation. Injection of an oxidant into the flue gas (upstream of WFGD) to oxidize Hg^0 appears to be the simplest method of implementation. The biggest challenge is the selection of the proper oxidant and identification of the optimum process parameters. Zhao and Rochelle have studied Hg^0 absorption in aqueous sodium hypochlorite (NaClO). They found that Hg^0can be significantly captured in such an oxidizing solution even at unfavorably high PH. Potassium hypochlorite (KClO) was also studied as an oxidizing reagent by Liu et al.

SYNOPSIS ON SELF BALANCING TWO WHEELED GYROCAR

A gyro-car is a two-wheeled automobile. The difference between a bicycle or motorcycle and a gyro-car is that in a bike, dynamic balance is provided by the rider, and in some cases by the geometry and mass distribution of the bike itself, and the gyroscopic effects from the wheels. Steering a motorcycle is done by pressing the front wheel. In a gyro-car, balance was provided by one or more gyroscopes, and in one example, connected to two pendulums by a rack and pinion.

The self balancing two wheeled gyro-car model is balanced dynamically by the rotating disc or wheel & also by the geometry & mass distribution o the model itself.

The project is about the designing of a two wheeler self balanced car. The two wheeler vehicle would be able to balance itself and can be stabilized against any impact and in zero velocity as well. We used two heavy rotating disks with hub motors at the chassis to compensate the tilt of the vehicle and get it stabilized. An android device is used to measure the tilt angle of the chassis using orientation sensor. The data then is sent to a blue tooth receiver that is connected with an arduino. An android application is developed which takes the angle of tilt of the vehicle as data input from the phone and sends a control signal to the arduino accordingly. Using the signals the vehicle is balanced by controlling the motor from the arduino which determines the tilt direction of the rotating disks. This vehicle is designed to provide the safety that two wheeler vehicle does not have during an impact. Our aim is to design a safe, cost effective and fuel efficient vehicle.

SYNOPSIS ON DESIGN AND DETAILING OF SEPARATING MACHINE

The objective of this project is to design a separating machine that will separate inorganic matter. Various types of separating machines are – Manual, Semi-automatic and Automatic. The separating machine consists of roller, pinion, sprocket, conveyor belt, ply-wood, hopper, hand-wheel etc. With the help of the machine domestic wastes like paper pieces, plastic bottles, metal –can etc. are collected, sorted and separated. The costing of the project is about Rs 7500. In recent times, various sorting systems have been developed. The applications of sorting varies from agricultural products, consumer manufactured products, books, etc. Constantin and Michael in 2002 reported that every sorting methodology can be classified based on the specification of two issues: the form of the criteria aggregation model which is developed for sorting purposes, and the methodology employed to define the parameters of the sorting model Few researches were also based on automatic sorting, manual sorting and online sorting methods. For example, few researchers proposed sorting system that can organize different material automatically without human aid, with the use of double acting pneumatic cylinder to push the material to its equivalent boxes on the conveyor belt. Other methods are the dielectrophoresis morphological transformation of labeling of materials, magnetophoresis fluorescence activated image segmentation. These proposed sorting methods however, have various problems attributed to them. For example, poor sorting efficiency, energy demand, multi-tasking and machine flexibility. In other to rise above the shortcomings of ever increasing sorting efficiency of materials, conserved energy and improve quality productivities, automatic sorting methods were proposed by various researchers.

SYNOPSIS ON SOLAR TRICYCLE

Tricycle is a widely used vehicle for transportation throughout India. The basic Tricycle is a three-wheeled design, pedaled by disabled persons in the side and seat in the middle for sitting arrangement. Of all vehicles, hand-powered tricycle are the worst affected by the rough, uneven roads in our country. Manual drive tricycle is more affordable than hand driven. We have developed a solar tricycle especially for disable person or handicap person. In this paper, we have discussed how to utilize solar power though the solar panel or photovoltaic cell and drive the brushless DC motor, battery, controller, throttle and all of the component through the reduced human effort.

Tricycle wildly used the purpose of the transportation in India and mostly used the handicap person because physically handicap. Basically tricycle is three wheel design and used hand power or manual drive. Most of the people who depend on the type of tri-cycle are daily Bread workers who have to travel long distance daily. The regular tricycle rider are unable to drive tricycle because of some injury and more effort and suffer. There are several types of tricycle that can be categories that 1 paddle tricycle, motorized tricycle, and electric tricycle. The weakness of the tricycle make people do not like to used tricycle. First, paddle tricycle needs a lot of energy to paddle the tricycle. The user will surely be tired after used the tricycle. Next, motorize tricycle that used fuel as it prime mover. The tricycle use fuel that is costly. Besides that, motorize tricycle will make pollution that can be very bad for our environment especially in this period that global warming happen to the earth. Electric tricycle that generate by battery can be only be sufficient for about an hour. The user needs to find power supply to recharge the battery or else they need to paddle the tricycle that used more energy compare to the normal tricycle because of the weight.

Solar powered vehicle use photovoltaic cell to convert solar rays into electrical energy. Electrical tricycle powered by the battery power is sufficient about an hour’s. The objective of this project is to design and fabricate a solar powered tricycle that will be reliable and economical. Photovoltaic cells are used to convert the solar energy into useful electrical energy. The main components of the tricycle are Solar panel, DC Motor, Motor Controller, Brake, Wheel, Suspension, Battery, Chassis, and Steering.