Pds for a city bus construction essay

City BusMatthew SaccoB. Eng in Mechanical Engineering Manufacture

P1: Form a PDS for a City Bus

Product Identification

City BusFunctiondrive passengers from one location to anotherSpecial features: EfficientFlexible servicesComfortableReliableStabilityCheapAccommodate all kind of personnel (kids, tourists, elderly, persons with disabilities, etc...)Seating capacity should not exceed more than 40 passengers; 30 seated and 10 standing excluding driverKey performance targets: Holds certain amount of passengers during one journeyProduce audible ring when passengers want to stopDisplay location that the bus is travelling inSupport holders must be implemented throughout the busSilent operation: noise level below 90dBSufficient weight to hold the vehicle intact on roadService environment: All type of weather conditions temperatures and humidityMaterial should resist corrosion, damping, wet environments and humidityShould withstand sudden vibrationsSustain only minor surface damage such as scratches and small dentsPainting should not fade with sunlightDriver training is required

Physical Description

According to ‘ Central Motor Vehicle Rules (1989)- Rule 93,’ A City bus dimensions should be approximately : 11 x 2. 5 x 3 metersTight turning capabilitiesEco-friendlyGood road handlingCushioned seatsSmooth interiorGood floor grippingConvenient bus entryGood spacing between seatsEasy accessible ring buttonsSufficient lighting devices upon entry and passenger areasProperly air-conditioned and well ventilatedDriver must have full control of the bus

Maintenance

Easily cleanedBus should be serviced every six months

Financial Requirements

Project should be finished in 18monthsThis suggests that work from the design stage up to manufacturing phase should not acquire more than 18 monthsProfit cost: 10% on each bus sold

Market size

Total bus sales volume must reach 150 units per year across EuropeThis was based on studies made by Ernst and Young Company, where the sales market of buses in 2010 was reviewed.

Material

Stiff and lightweight bodyPlastic and rubber touching such as bumpers, dash boards, seat shell, and passenger supports, etc...

Life-cycle target

Trustworthy lifetime 15-20 yearsCost of operation: As low as possibleExcellent reliabilityEnd of life strategy: should be scrapped in an adequate scrap yard

Financial Requirements

Prices are to compete with other city bus manufacturers approx €150, 000 to €200, 000Warranty: One year on parts and two years on engine should be offeredThis was based in the standard Telecommunication (Customer Service Guarantee) Standard 2000Discount rates for services

Social, Political, and Legal

Safety and environmental regulations. Applicable requirements government regulations for all intended locations. Standards such as: Equality Act 2010Bus Safety Act 2009The Public Service Vehicle Accessibility Regulations 2000The Public Service Vehicles Accessibility (Amendment) Regulations 2000The Public Service Vehicles Accessibility (Amendment) Regulations 2002The Public Service Vehicles Accessibility (Amendment) Regulations 2003The Public Service Vehicles Accessibility (Amendment) Regulations 2004Bus Safety Regulations 2010Transport Integration Act 2010Transport (Compliance and Miscellaneous) Act 1983Driving license in a specified category should be maintainedRoad Safety (Vehicles) Regulations 2009Federal Transit Administration Testing of BusesSafety and product liabilityAppropriate transport should be considered as appropriate in a specific social and cultural context and for specific social groupsProduct should maintain its own patents

Manufacturing Specifications

Appropriate space and manufacturing layoutIdentify local and foreign suppliersFeasible manufacturing aspectEngine should be placed at the rear end

P2: Explain the selection of particular PDS entries

Malta used to employ buses that were not comfortable, inefficient, and heavy in weight, produced a lot of noise and emissions and did not offer a proper air –conditioned system. This caused an unreliable service, resulting in a small number of people that utilize such transport. Therefore the local government opted to make use of better bus services with the aim of having

reliable buses and have an increase in such transport method. This was done by highlighting several aspects that had to be implemented so as to improve such quality of the product. Therefore the PDS conducted in P1 was based on such example taking into consideration the important exploitations and manufacturing approach of such product. The main principle of a city bus is to carry passengers from one place to another around the city stopping at different stops. These buses generally travels according to a specific route, therefore correct amount of buses have to be chosen depending on the size of the cities. The service provided from these buses should be very efficient, since a lot of people will be using such transport. It is also important to be efficient, so as to attract customers that do not use such service. Being efficient requires several important points that should be considered when manufacturing a city bus. It is important that a city bus is designed in order to accommodate all kind of personnel such as employees, elderly persons, kids, parents, persons with special disabilities and so on. Therefore it is important that the entry step should be designed to facilitate an easy access to get on the bus. Such factor can be obtained by placing the engine at the rear end in order to have a low and convenient entry. This is an important factor for a company/government because the more persons that use such service the better will be the profit and less traffic is consumed. Therefore one has to make sure that a reliable service is provided. To be reliable requires offering accurate timing journeys without any delays along with cheap fees and comfortable service. The key performance targets of a city bus consist of the main goals that the bus is to perform. Since passengers will want to stop at different locations, audible ring is to be implemented along the bus. This push button will give a signal to the bus driver that a

passenger is intended to stop at the next stop. These ring buttons must be exposed frequently in the bus so as all passengers across the bus can have easy access for these buttons. They must also be easily pushed. Another important factor that should be found in a city bus is the location that the bus is travelling in. This feature allows the passenger such as tourists to know when to stop, or let the passenger know the estimated time required to reach the designated location. The bus should also be spacious and big enough to hold certain amount of seated and standing passengers. The total amount of passengers that are allowed to travel in a city bus must be well chosen. This should be well analysed because, the bus must maintain all its main features even when bus is full. The bus should feature support holders throughout the bus so that standing passengers can hold to these supports or to hold such supports when passengers are getting off the bus. The bus is to maintain a silent operation with the aim of avoiding people getting annoyed or getting ill during their travelling. When a city bus is manufactured one have to keep in mind that such product will be exposed to different weather conditions such winds, humidity, sun, damped and wet environments, etc... Therefore one has to keep in mind that these buses must be resistible to such elements. As a result to this the bus should feature a well air-conditioned and ventilated air inside the bus. This would offer comfort to the passengers using such service. Performing a comfortable ride helps the organisation to increase its customers along with offering a reliable service to its customers. In order to withstand maximum comfortably the bus must have an excellent suspension system, so as to endure sudden vibrations. One must also take into consideration the body of such bus. It is relevant if the bus have a stiff and light body weight. Having a stiff chassis

help the bus to maintain several loads and impacts that do not cause any damage to the body of the bus. Since the engine will be placed at the rear end the chassis has to be shaped in a step form. This will cause a decrease in height at the back of the bus but features an appropriate entry. Such steps can be seen in figure 2 where the rear of the bus has a lower height than the front. This is because the engine is placed at the back. http://www. volvobuses. com/SiteCollectionImages/VBC/india/335%20x%20122_631. JPGFigure - City Bus chassisThe painted surface must prevail against scratches, and dents that can occur to the exterior of the bus. Paint must also resist the previously mentioned weather conditions, thus paint must not fade by sunlight or body gets corroded due to wet environments. It is important that only trained drivers are allowed to drive such bus, since training is required drivers that would like to offer such service. When manufacturing a bus one has to consider the dimensions of the bus. It is important that the correct dimensions are chosen. Although a legislation standard is not available for such requirement, the standard size for a city bus is 11 x 2. 5 x 3 meters. The height should allow persons to stand straight when required. It is important that the bus have the correct dimensions, because if the bus size is bigger than it’s meant to, the bus would not be eligible to turn tight and sharp corners. Since the bus will be used in cities the bus manufacturer has to emphasise on producing an eco-friendly bus, meaning that the bus should emit low emissions. Such criteria can be sustained with light body weight, because it the bus has light in weight than the emissions decrease. This can be achieved by using plastic touching such as bumpers, dash boards, and rubber foe seat shells, and passenger supports, and so on. One has to make sure to use the right material for the

proper application. This is a beneficial aspect to the environment and the people themselves, since air should be as clean as possible. For the sake of a clean environment the engine has to be regularly maintained and serviced. Apart from having the engine being serviced every year, the bus has to be easily cleanable, since the bus interior would be cleaned daily. This makes the bus more reliable, cleaner and economic. http://www3. pcmag. com/media/images/114951-bus-interior. jpgFigure - Bus interiorAn additional significant factor that the bus must have is good road handling. This prevents the bus from skidding. This risk can be minimised by having adequate tires and tire grip, and proper and well maintained braking system. Another major feature that needs to be considered when manufacturing the city bus is its interior. The interior has to be a robust one since it will be highly used. Also the seats must be cushioned so as to provide a comfortable journey to the travellers. Another manufacturing point that should be considered is proper spacing between the seats. This should offer sufficient leg room for the passengers that will be seated. Once these factors have been maintained it is important that the surface finish of the interior must be smooth. Smooth surfaces are important so that no one could be injured. The bus should have a good floor gripping so as to anticipate any slippages. Given that city buses can work day and night it is essential that proper lighting is found along the bus. Proper illumination can offer the traveller easy access upon entry and good visualisation whilst travelling during the night or dark surroundings. When manufacturing the city bus apart from providing the customers with a comfortable and reliable journey, one has to also consider the driver. It is important that the driver must have full control of the bus. Switches and indicators must be easily accessible and well

indicated. Comfortable seat and seating position are required since the driver will be seated for a long time. The manufacturer has to ensure that the lifetime of the bus is trustworthy, having a lifetime of 15 to 20 years. This means that the bus can be used for several years before scrapping it in an adequate scrap yard. This factor should be highly considered because if other companies offer a better lifetime guarantee on their product, the government or company investing in such city buses do not choose such product. Apart from this lifetime one should ensure that the running cost of such bus is kept as low as possible. The manufacturing company has to keep in mind that the selling price for the bus should be kept as low as possible so as to compete with its competitors. The company has to ensure that the customer purchase a value for money product. Moreover the company can gain better confidence by offering a warranty on the engine and certain parts of the bus. Apart from this the manufacturing company can offer several discount rates on parts and servicing. This makes the customer more confident to purchase such item instead of others. As already mentioned the manufacturing company must ensure the safety of the people using such buses. Therefore it is important that regulations and legislations are well reviewed. The section Social, Political, and Legal found in the PDS shows a list of regulations that needs to be followed and maintained by the manufacturing company. The standards found in this section are not only applicable for bus manufacturers but also for the company/government that is going to implement such service. Each standard carries a particular scope in which one has to make sure to follow. This ensures the safety of such bus and its liability. This is achieved due to appropriate transport consideration of where the bus will be used. The manufacturing company has to ensure

that the workplace have sufficient space for manufacturing such product. The manufacturing company has to determine whether the bus is to be built completely at its own facility or opt to buy frameworks and chassis separately and assemble them at their premises. The company has to opt for the best and most feasible solution. Once that the company has decided the manufacturing approach that it will be using, proper identification regarding local and foreign suppliers required for the completion of the bus have to be made. Based on my intuition the time taken by a company to finish such project shall not exceed 18 months. The bus should yield a 10% profit on each sale acquired with a bus sale of 150 buses yearly across Europe. Looking at this example one can conclude that a proper product design specification is to be conducted. This helps the company to determine the main features and targets that are required by the product that is going to be manufactured. All considerations have to be considered so as to have a successful product.

D3- Discuss innovative, possible future developments on your product.

City buses are well-known for the simplicity that they feature. If an innovative idea is to be implemented to such product proper brain-storming is required. Brainstorming will help the company to benefit from different ideas that one can generate. Such ideas can result in implementing new features in your product with the benefit of having better features than your competitors. One has to keep in mind that, each new feature that will be implemented to such product carries its own cost. Therefore one has to make sure that the price of such bus should be competitive to those offered

by its competitors. An innovative thing that could be implemented to such and can be a benefit to the company that runs such service is to have a hybrid engine. Hybrid engines combine a mixture of running fuel and electric motors. Fuel is generally used when the motors do not have sufficient charge to work. This should consist of motors, batteries, generator and several converters. The electric motor applies resistance to the drive train causing the wheels to slow down. In return, the energy from the wheels turns the motor, which functions as a generator, converting energy normally wasted during coasting and braking into electricity, which is stored in a battery until needed by the electric motor. This will generate efficient and generate lower running costs, apart from producing no emissions when the bus is running on electric motors. https://www. eta. co. uk/wp-content/uploads/imported/images/electric%20bus. gifFigure - Hybrid Engine implemented on a busAnother innovative feature is to employ televisions on the bus. By this feature the company ensures that passengers do not get annoyed during their travelling. Such televisions can also be used to merchandise the city itself and the shops found around the city. Parking sensors can also be implemented to such buses. This will help the driver to have a better control of the bus when reversing, since it is very difficult to handle such bus due to its length and visual limitations. These sensors will provide the driver with a beeping alert when reversing. The beep pulse varies according to the distance between the bus and another object. Also a small display will indicate the total distance between the bus and the object. In most cities buses have their own lanes to travel in, so as to consume less traffic. Therefore one can implement cameras to the front panel of the bus, in order to monitor car that are not allowed on such lanes. The camera

should be capable of sending information to a governmental office, so as to fine cars that are not allowed to travel on such lanes. This could minimise the abuse of having cars make use of such lanes, increasing the efficiency of the bus service. Before a company implements innovative ideas or improvements, certain considerations have to be estimated. It is not feasible if a manufacturing company decides to put all the ideas mentioned above without considering costs. This is because cost plays a role part for such product. it is good if such innovations are put in practice but as already mentioned several aspects have to be considered before putting such things into manufacturing.