# Developing Decision Support System on Continuing the Work Contract

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**Abstract.** This paper describes how to develop a decision support system on continuing the work contract. Customer satisfaction and continuity of work contracts carried out in a certain period of time and usually carried out yearly or annually (the validity period of a year contract) and then extended or there is also the possibility of being terminated. It all depends on the performance. The key to sustainability is achieving performance in accordance with what has been requested and planned. This research uses SDLC model that consists of 5 steps such as planning, analysis, design, implementation, and maintenance. Subjects of the research are people who use the system in the company. This research is still on going and the researchers would like to present the design of the system. Research findings show that IT-based decision support system on continuity of work contract is the most feasible model to be implemented.

**Keywords:** work contract, customer satisfaction, decision support system, transportation

## 1. Introduction

Based on Law No.1 of 1970 concerning Occupational Safety the government has formulated and implemented policies and technical standardization in the implementation of Occupational Health and Safety (K3) by covering organizational approaches, technical approaches and individual approaches to labour. Occupational Health and Safety System (SMK3) has been implementing in Indonesia since 1996, its application is mandatory for companies that employ a workforce with one hundred or more people, or contain potential hazards that are caused by process characteristics, or production materials that can result accidents in workplace such as blasting, fire, pollution and occupational diseases as published by Minister of Manpower Regulation No. 05 / Men / 1996. This provision was also reinforced by Law No. 13 of 2003 and the latest is PP No. 50 of 2012 concerning Occupational Safety and Health Systems [1].

However, currently the implementation of occupational health and safety in Indonesia still has several obstacles. There are three kind of obstacles, namely the lack of consistency and political will of the government (legislative holders of budget politics) with a proportional portion of the K3 movement, lack of government attention in proposing constitutionally and professionally to the council regarding program budgets, and K3 perpetrators (employers and workers) not prioritizing safety first. Hence, the safety first has not been cultivated and entrenched in the worker's environment. The imposition of minor sanctions in the event of an accident, is one proofing the lack of law enforcement. Negligence of companies that focus only on profits, and the lack of supervision of the implementation of SMK3 from the government, are two major causes of worker death.

PT. Elnusa Petrofin is a company that has transportation services of delivering oil and natural gas from an originated division of the national oil company. Transportation is a movement of goods and persons from place to place and the various means by which such movement is accomplished. The growth of the ability to transport large quantities of goods or numbers of people over long distances at high speeds in comfort and safety has been an index of civilization and in particular of technological progress. Local management teams are usually responsible for managing transport activities, including situations in

which vehicles are based at a separate location or in the event that provision of vehicles is outsourced to an external company or an organizational transport unit. The responsibility for monitoring and controlling performance and for setting standards always remains with the health unit [2]. PT. Elnusa Petrofin turned into a publicly oriented company broadly and the area of its operations covered all regions of the Republic of Indonesia. It has business pillars which are the main focus of the company, focusing on the oil / gas products / services business supported by the Transportation, Depot, Retail Gas Station, and Specialty Chemical Trading businesses.

Occupational Health and Safety (K3) program, is a K3 activity in the downstream oil and gas industry which is included in the category of being highly calculated, even though it is not as strict as its implementation in the upstream industry. In the upstream industry, PT. Elnusa Petrofin cares occupational health and safety very seriously. K3 Program at PT. Elnusa Petrofin is excluded by K3LL (Safety of Occupational Health and Environmental Protection). This is related to the core business of PT. Elnusa Petrofin which distributes oil and gas (BBMG). BBMG distributed by PT. Elnusa Petrofin is very vulnerable and very dangerous if the parties do not pay attention to the K3 elements. PT. Elnusa Petrofin considers the aspects of Safety, Occupational Health and Environmental Protection (K3LL) as the important as achieving operational and quality targets. It aims to support and achieve a safety work environment for employees, partners and stakeholders. Implementation the K3LL aspect is a very important and inseparable element in the criteria for determining the level of qualifications, capabilities and performance of the company. Hence, the company has set targets set in each field of activity. Occupational accidents in the work process at PT. Elnusa Petrofin is still happening, so that the company's management decides that the implementation of K3LL program needs to be reviewed, especially several work processes carried out by third parties (outsourcing). The K3LL program of PT. Elnusa Petrofin must be thoroughly evaluated both planning, implementation and results.

Several cases of transportation occurred, including a tank owned by PT. Pertamina Semarang exploded [3], a series of accidents which were caused by exploding premium carrier [4], and one tank car belonging to PT. Pertamina Gorontalo caught fire, allegedly the car caught fire because it was struck by a spark from the vehicle engine [5]. Another problem was the rampant protests and strikes of tank car crews (AMT). The AMT Pertamina protest and strike was the aftermath of the problems at various depots. Based on the cases, it can be concluded that the process of transporting chemicals, especially loading chemicals, oil and gas, must be paid more attention and documented clearly. The problems are appeared because the system is still done manually. Hence PT. Elnusa Petrofin cannot decide continue any contract based on the good satisfy of contractor.

The same thing happened overseas, a study conducted by researchers from Newcastle University, UK stated that accidents involving the transportation of petroleum products on highways had been associated with high frequency of events and high security consequences in developing countries. One example is Nigeria, there were 2318 accidents involving tank trucks were analyzed from 2007-2012 with a customized risk assessment framework. The research findings shew 79% of accidents occur due to human factors, especially dangerous driving attitudes. More than 70% of the accident injuries were spills, fires and explosions. 81% of accidents in either injuries, fatalities or both. Most of the 972 accidents with fatalities recorded 1-5 deaths with a frequency of 0.89. Approximately 7 million USD is estimated as the average cost per accident. This significant cost estimate should motivate policy to create improvements in each country [6].

The objective of the research is developing transportation system on continuity of work contract. Using the new system, organization will gain some advantages: (1) Managing the history of skills and competency of contractors; (2) Monitoring and evaluating the competency of drivers; (3) Monitoring and evaluating the condition of tank cars; (4) Evaluating contractor performance that can be used to decide the continuity of contract; and (4) Improve innovation and activities in the organization.

## 2. Method

*2.1. Method*

Authors use System Development Life Cycle (SDLC) [7], that is divided into 6 phases. They are Planning, Analysis, Design, Implementation, Maintenance, as can be seen in Figure 1. The system-development life cycle enables users to transform a newly-developed project into an operational one. The System Development Life Cycle, "SDLC" for short, is a multistep, iterative process, structured in a methodical way. This process is used to model or provide a framework for technical and non-technical activities to deliver a quality system which meets or exceeds a business's expectations or manage decision-making progression.

SDLC that contains seven phases can be described as follow: (1) **Planning.** The first phase in the systems development process can identify whether or not there is the need for a new system to achieve a business's strategic objectives. It is a feasibility study for a company's business initiative to acquire the resources to build on an infrastructure to modify or improve a service; (2) **Analysis**. The second phase displays the organization with its problems, and the need for a change. This is where organization consider the functional requirements of the solution. It is also ensuring the new system to meet the expectations; (3) **Design.** The third phase describes the necessary specifications, features and operations that will meet the functional requirements of the proposed system. This is the step for end users to discuss and determine their specific business information needs for the proposed system. During this phase, the important things to consider are hardware and/or software, networking capabilities, processing and procedures of the new systemThis work includes using a flow chart to ensure that the process of the system is properly organized. The design phase marks the start of physical design; (4) **Implementation**. The sixth phase is when the majority of the code for the program is written. It involves the actual installation of the newly-developed system. This step puts the project into production by moving the data and components from the old system and placing them in the new system; and (5) **Maintenance.** The seventh and final phase involves maintenance and regular required updates.

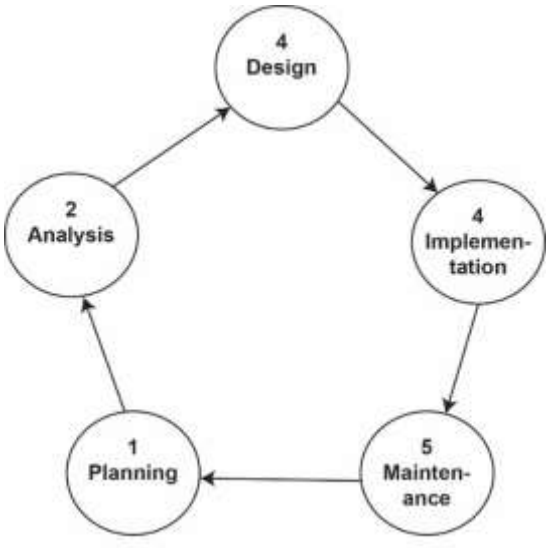


**Figure 1.** System Development Life Cycle

*2.2. Respondents and Location*

The object of the research is contractor that is used by PT. Elnusa Petrofin in Jakarta. Respondents consist of managers, supervisors, drivers and staffs that run the system.

## 3. Introduction

Discussion involves Planning, Analysis and Design that have been conducted.

*3.1. Planning*

Transporting oil and gas, had to be paid more attention when it was not documented clearly, because system was done manually and caused many problems. PT. Elnusa Petrofin could not decide to continue any contract based on the customer satisfaction was low. Developing a new IT-based system was proper in order managing the delivering of oil and gas.

*3.2. Analysis*

Using questionnaires, and deep interview, researchers got the data of current system. Figure 2 shows context diagram [8] that present the whole system and the level 0 data flow diagram presents the detailed diagram of the system that can be seen in Figure 2. There are two entities, manager and contractor, providing with four files that stored data of contractor, driver, tank car, and fuel. The detailed diagrams can be seen in Figure 3.

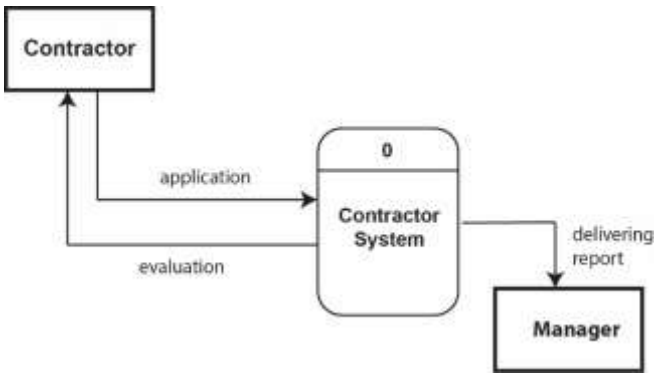


**Figure 2.** Context diagram

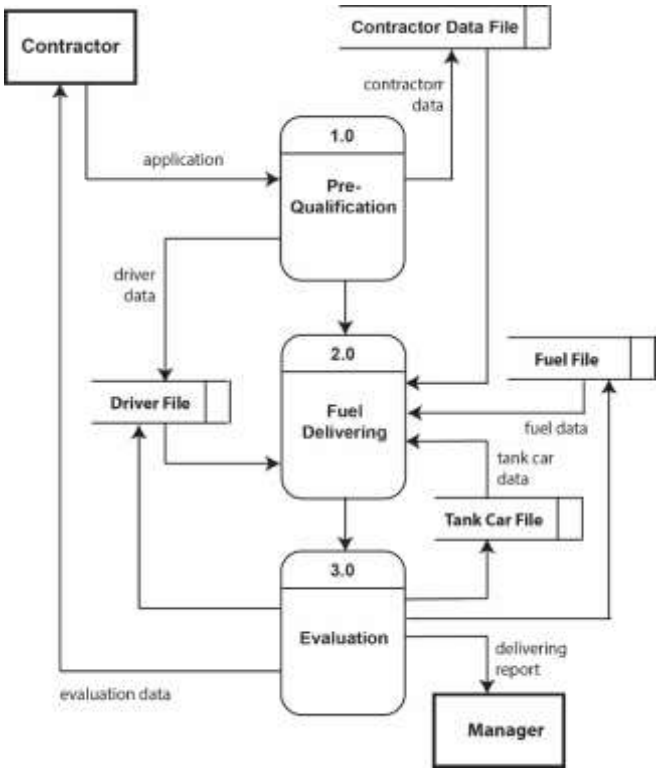


**Figure 3.** Level 0 data flow diagram

Figure 3 describes that there were three processes, two entities, and five files. The beginning of the system indicated with service applying by contractor. Based on the standard that was used of the system, the application was reviewed. Regarding the process that was called Pre-Qualification, system store the data of contractor with its drivers. If the contractor passed the process, the drivers would work delivering oil and gas using certain tank car, that was belonged to P.T Elnusa Petrofin.

During the contract was running, the process was fuel delivering, and all the services by contractor would be evaluated in the end of contract. The evaluation would be the important consideration whether the contract could be or not continued. Customer satisfaction and continuity of work contracts carried out in a certain period of time and usually carried out yearly or annually (the validity period of a year contract) and then extended or there is also the possibility of being terminated. It all depends on the performance.

The problem of the system was done manually, so manager could not make decision easily, bacause data was not available when it was needed, inacurate, and some data was missing.

*3.3. Design*

Since the system had to be changed from manual to computerized, researchers used the same data flow diagram that were used in the old system (Figure 2 and Figure 3). Relationship between the data were presented in Entity and Relationship Diagram [7] as can be seen in Figure 4.

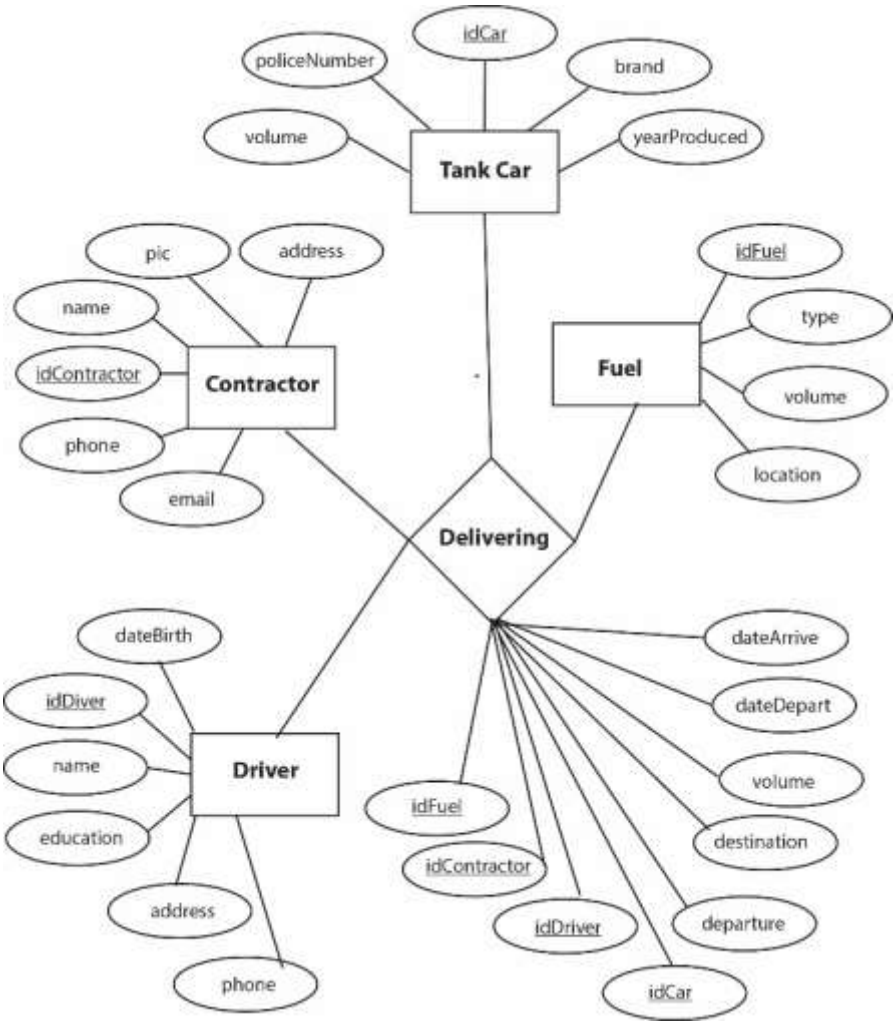


**Figure 4**. Entity and relationship diagram

Completing the design system, it was presented on database design with five tables that provided with attributes, and its type, length and description. Database design is the organization of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, they can begin to fit the data to the database model. Database design involves classifying data and identifying interrelationships. [9]. Based on entity and relationship diagram in Fig. 4, there are four entities and one relation, so researchers designed contactor, driver, tank car, fuel, and delivering table, as can be seen in Table I, Table II, Table III, Table IV, and Table V with their attribute keys. Table 1 presents physical data of contractor, Table II presents physical data of driver, Table III shows what kind of tank car data is stored, Table IV visualizes data of fuel, and Table V consists of delivering data.

**Table 1.** Contractors

| ***Attribute*** | ***Type*** | ***Length*** | ***Description*** |
|---|---|---|---|
| idContractor | char | 10 | Identity of contractor |
| name | char | 15 | Name of contractor |
| pic | char | 50 | Person in charge |
| address | char | 50 | Address of contractor |
| phone | char | 15 | Phone of contractor |
| email | char | 15 | Email of contractor |

**Table 2.** Drivers

| ***Attribute*** | ***Type*** | ***Length*** | ***Description*** |
|---|---|---|---|
| idDriver | char | 10 | Identity of driver |
| name | char | 15 | Name of driver |
| dateBirth | date | 8 | Date of birth driver |
| address | char | 50 | Address of driver |
| education | char | 25 | Driver's education |
| phone | char | 15 | Phone of driver |

**Table 3.** Tank cars

| ***Attribute*** | ***Type*** | ***Length*** | ***Description*** |
|---|---|---|---|
| idCar | char | 10 | Identity of car |
| policeNumber | char | 15 | Number of vehicle |
| brand | date | 8 | Production factory |
| yearProduced | char | 4 | Year of car was produced |
| volume | number | 10 | Volume of tank |

**Table 4.** Fuel

| ***Attribute*** | ***Type*** | ***Length*** | ***Description*** |
|---|---|---|---|
| idFuel | char | 10 | Identity of fuel |

| *Attribute* | *Type* | *Length* | *Description* |
|---|---|---|---|
| type | char | 8 | Type of fuel |
| location | char | 50 | Address of fuel storage |
| volume | number | 10 | Volume of stored fuel |

**Table 5.** Delivering

| *Attribute* | *Type* | *Length* | *Description* |
|---|---|---|---|
| idContractor | char | 10 | Identity of contractor |
| idDriver | char | 10 | Identity of driver |
| idCar | char | 10 | Identity of car |
| idFuel | char | 10 | Identity of fuel |
| volume | number | 10 | Volume of delivered fuel |
| departure | char | 50 | Address of departure |
| destination | char | 50 | Address of destination |
| dateDepart | date | 8 | Date of departure |
| dateArrive | date | 8 | Date of arrival |

After database design creating, the next step is designing user interface, that consist of input of application data and report of delivering as can be seen in Figure 5 and Figure 6. Form Report indicated the time delivering, hence Manager could see whether the time fuel arrived at the location where it shipping was defined on time or behind schedule. The safety of deliverance was appeared in the report form. If there was any problem during the delivering, driver should make a report on other form and providing with documents. They can be used by manager to make decision continuing the contract, or stop the contract and try to find another contractor. Manager should write a note if the contract should be continued or not.

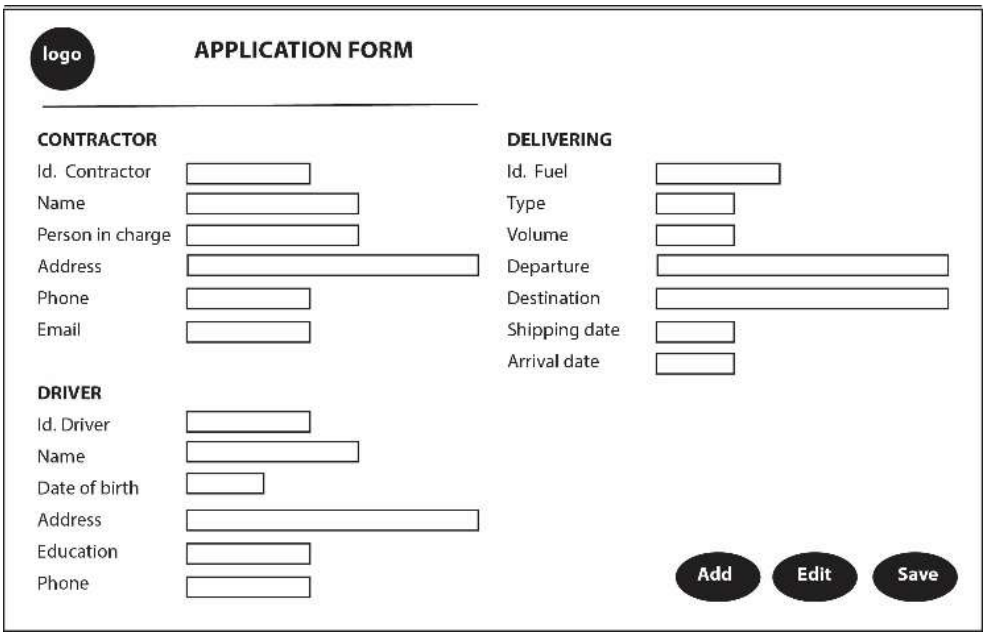


**Figure 5**. Application form

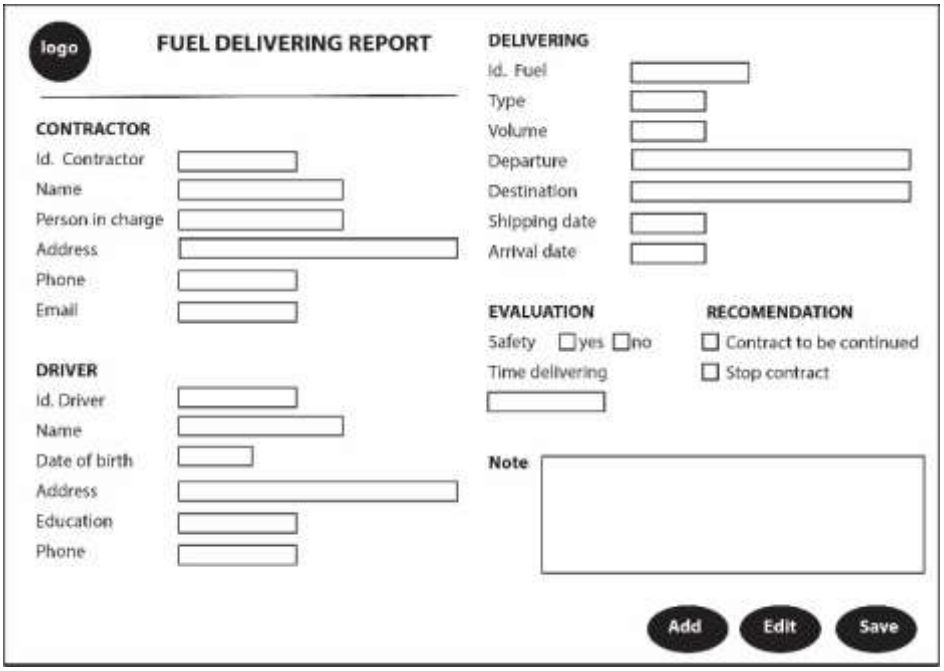


**Figure 6**. Evaluation

## 4. Conclusion

Based on the objectives and the results obtained in this initial study, it can be concluded as follows: (1) Managing contractor can be supported using computerized system; (2) The information derived from the initial research was used as a guideline for production the contractor information system; and (3) The Development of contractor information system was carried using combination of System Development Life Cycle (SDLC).

For future work, the design of contractor information system should be continued producing and implementing in the next phases of this research

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