Fleet management: Assessment of the best practices

Rachida Hamzi, Noureddine Bourmada, Mohamed Bouda

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Hamzi Rachida, Bourmada Noureddine
Laboratory of Research in Industrial Prevention
Institute of Health and Industrial Safety
University of Batna
Batna, ALGERIA
Hamzi_hr@yahoo.fr

Bouda Med El Abbes
Institute of Health and Industrial Safety
University of Batna
Batna, ALGERIA

Abstract—fleet safety is seen as important, not just for fleet operators, but as a strategic approach to improving the safety of the entire vehicle fleet. Corporate purchasers of vehicles and transport services can specify high safety standards and thus create an economic imperative for providers of vehicles and transport services to meet these standards.

Fleet management comprises all actions needed to maintain and operate pieces of equipment throughout its life from the beginning stages of equipment acquisition to the final stages of asset disposal. Such areas include maintenance and repair, inventory control, training, and safety issues.

A company fleet management process is evaluated using two methods: Haddon matrix which is implemented to evaluate organizational safety context into which the driver assessment, monitoring and improvement program should fit. Haddon provides an all-encompassing pre-crash, at-scene and post-crash systems-based framework for fleet safety. The network influence method which is presented as a risk management method.

***Index Terms*— fleet management, best practices, HADDON matrix, Influence Network.**

I. INTRODUCTION

Road traffic crashes are one of the world's largest public health and injury prevention problems. The problem is all the more acute because the victims are overwhelmingly healthy prior to their crashes. According to the World Health Organization (WHO), more than a million people are killed on the world's roads each year [1].

The ISO 39001 "Road Traffic Safety Management" is an upcoming ISO standard for a management system (similar to ISO 9000) for road traffic safety. The implementation of the standard is supposed to put the organization that provide the system "road traffic", into the position to improve the traffic safety and to reduce by that the number of persons killed or severely injured in road traffic [2].

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The combining of two methods: HADDON Matrix and Network Influence, is used to assess the best practices in fleet management. Phase I present the results of the application of the HADDON matrix method, It is a very useful self-audit tool. It is used simply by asking the question 'do we have the following in place?' for each of the statements in the matrix. Analysis of the available data (typically insurance claims) allows the extent and full costs of the problem to be understood. Employee surveys and focus groups allow a consultation, involvement and pledging process to be developed [3,4]. Phase II, concern the network Influence applied to the fleet management using the results of HADDON matrix to identifying effective measures to improve performance [5,6].

II. THE HADDON MATRIX

The Haddon Matrix is particularly useful as a framework for undertaking an overall review of the organizational safety context into which the driver assessment, monitoring and improvement program should fit. Haddon provides an all-encompassing pre-crash, at-scene and post-crash systems-based framework for fleet safety "Table.1" [7].

As well as classifying improvement interventions to be piloted, implemented and embedded, it can be used as a gap analysis and investigation tool by asking: 'Do we have the following in place?' for each of the statements in the Matrix. 'No' responses indicate the gaps in the fleet safety system, some of which can be addressed by training [8,9]

The matrix presented in literature concerning the fleet management, is applied in the industrial middle to an oil company. The fleet of the company of the number of 925, this one is completed by a fleet under treaty which assures: The missions except region, · The Distribution of the meals on sites, Transport partial of the staff. In this phase of analysis, we compare the best practices presented in the table.1, and what really realized in the company with regard to the factors:

- Management culture,
- journey,
- Road/ site environment,
- People-drivers and managers,
- vehicle
- And External/societal/ community/ brand.

	Management culture	journey	Road/ site environment	People-drivers and managers	vehicle	External/societal/ community/ brand
Pre-crash or pre- drive	Business case Legal compliance Safety audit, claims analysis & focus group discussions Benchmarking Board level champion Pilot studies & trials Goals, policies & procedures Safety culture/climate Management structure Fleet safety committee Safety leadership by example and commitment Communications program Contractor standards Grey fleet (own vehicle) policy	Travel survey Travel policy Purpose Need to travel Modal choice Journey planning and route selection Route risk assessment Journey scheduling Emergency Preparedness Shifts/working Time Fatigue management	Risk assess Observation Guidelines& rules Site layouts& Signs Work Permits Delivery & collection procedures Road improvement Blacks-spot mapping and hazard assessments Engage local and national agencies	Select Recruit Contract Induct Licensed & qualified Handbook Risk assess Train Work instruction Engage & encourage Equip high Communicate Driving pledge/ rules Health & wellbeing Monitor Correct	Risk assess Selection Specification Active and passive safety factures Standards Servicing Maintenance Checking Use policy and legal compliance eg loading Mobile communicate and navigation policy Intelligent transport Systems(its) and telematics to monitor Wear and tear policy Grey fleet standards	Regulator/policy Engagement Insurer engagement CSR External benchmarking External communications Family members program Community involvement Engaging other road users Road safety weeks /days Safety/eco groups European road safety Charter Road safety conference presentations Media/outreach/PR Safety & environmental achievement awards
At scene	Emergency support to driver	Engage local investigators	Manage scene	Known process and crash pack/ bump card to manage scene	Reactive safety features Crashworthy ITS data capture	Escalation process
Post- Crash	Policy and process to report ; record & investigate Incidents Change management Process Ongoing claims data analysis Data warehousing& Linkages Evaluation, KPI Benchmarking& program development	Debrief and review Review journey elements of collision data Ongoing journey management review	Investigate and improve Review site/ road elements of collision data	Reporting and investigation process Driver debrief and corrective action Review people elements of collision data Counseling ; trauma management & support Reassess/train	Strong operable doors Investigate ITS data Vehicle inspection & repair Review vehicle selection & use	Manage reputation and community learning process

Table.1. Matrix HADDON applied to the fleet management

III. NETWORK INFLUENCE METHOD

The Influence Network (IN) is a risk management technique with the fundamental purpose of identifying effective measures to improve performance. This is done using a model of the typical factors that influence risk. The approach originated in the maritime industry for the formal safety assessment of ships. The IN model is customized for the specific problem to be analyzed and then assessed in a workshop using a group of subject experts [10].

The top of the network influence is the event in the study. Followed by the direct level of influence constitute human factors, direct equipment and its environments. They are the most obvious factors for an accident given and are thus the easiest to be determined. The most important are the underlying influences which contribute to the occurrence of the accident or its prevention. To model these influences, the influence network adopted a hierarchy of the levels of causality describes as follows "Fig. 1":

- The direct level influences: it includes the situations at risk, the dangerous actions and the material failures which influence directly the occurrence of an accident.
- The level organizational influences: it includes factors organizational, which determine to handle it of progress of the activities in the company, and influence the direct influence level.
- The strategy level influences: it reflects the expectations of the decision-makers of operational workers and the organization which they interface with interested parties (Customers, suppliers, subcontractors).
- The environmental level influences: it covers factors: regulations, market and the social influence.

In our application, in this phase of analysis, we opted for a workshop for the application of the Influence Network method. To have a representative team work we chose one or

two participants of every structure concerned by the management of the road risk in company. The composition of the team is described below:

- 2 representatives of the security
- 2 representatives of transport
- 1 person in charge of purchases
- 1 a person in charge of the maintenance conveys
- 1 responsible for the training

The stages of progress of the workshop are described below [11]:

Stage 1: identify key factors

The main factors deviations identify in the matrix HADDON are represented on the influence network. The first task of the group of the workshop was of makes sure of the relevance of the various charge represented on the network influence on the influence network. By adding or by combining so necessary factors we shall obtain a network who highlighted all the factors which contribute to the problem study.

Stage 2: Weighting factors

A methodology for quantification of the IN based on the judgments that are made in an IN workshop. The quantification can be used to provide a baseline for monitoring future performance and to identify the strongest paths of influence through the network and, therefore, where risk controls would be most effective[12,13] .

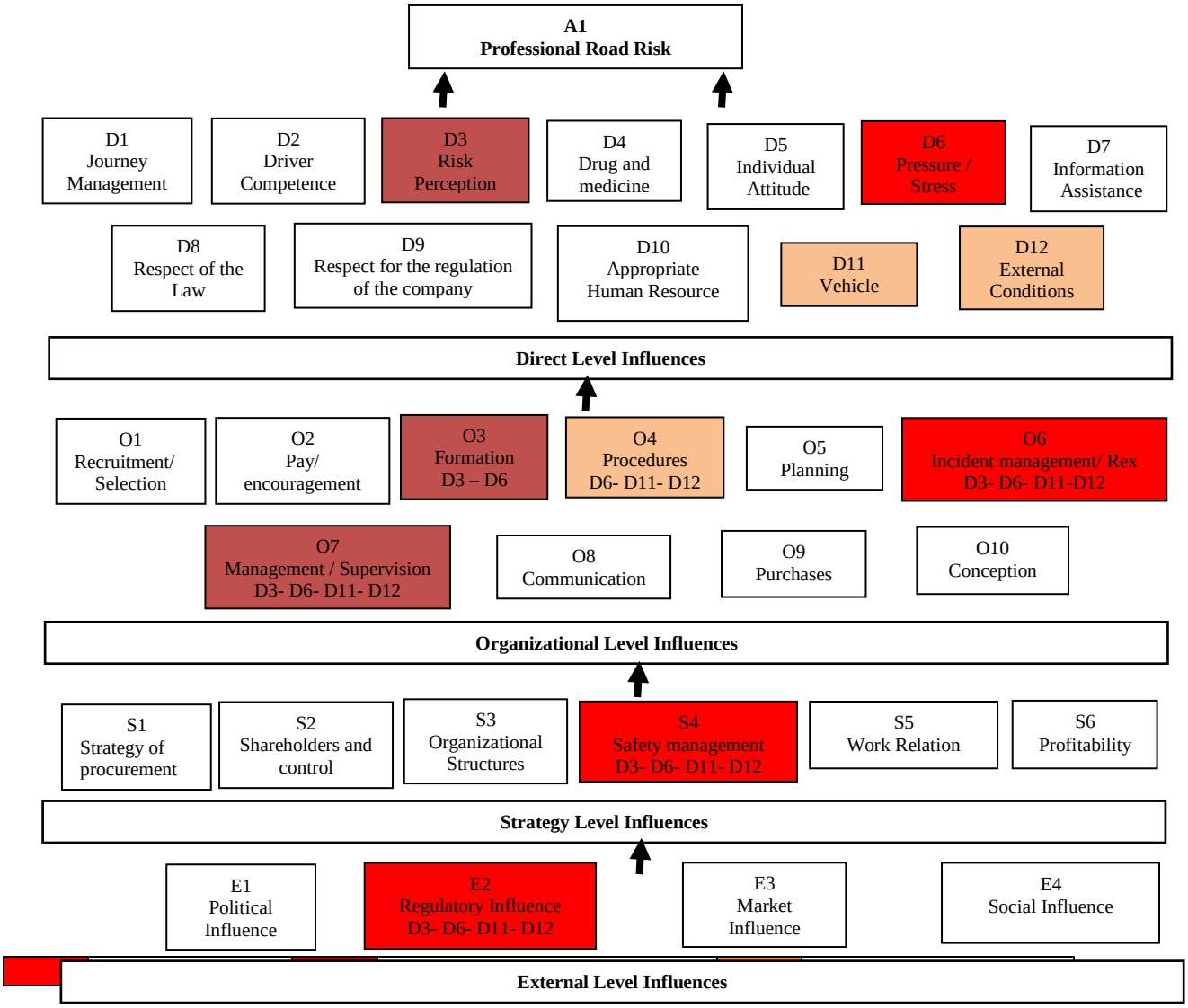

Fig.1. the Influence ways of the road risk management: Oil Company

Stage 3: Determination of the influence paths and the reduction measures of road risk

The factors of first level, identified as with high potential of reduction of risk, are studied one by one to draw the ways of influence from the fourth level of network in to the first one level. For every factors of direct level, it is necessary to determine the factors which can influence it at the organizational level, then the political factors which influence the organizational factors, up to the environmental factors. The results concerning this phase are reported on the schema below which is based on the generic version network influence [10] "Fig.1".

IV. DISCUSSIONS AND CONCLUSION

This part reviews the emerging area of fleet and work-related road safety in this through a review of the literature, interviews with fleet managers, and discussions with a wide range of fleet safety practitioners and other experts.

Table.2. Matrix HADDON applied to the fleet management in Oil Company

	Management culture	**journey**	**Road/ site environment**	**People-drivers and managers**	**vehicle**	**External/societal/ community/ brand**
Pre-crash or pre-drive	Pilot studies & trials Goals, policies & procedures Safety culture/climate Management structure Fleet safety committee Safety leadership by example and commitment Communications program Contractor standards Grey fleet (own vehicle) policy	Shifts/working Time	Risk assess Observation improvement Blacks-spot mapping and hazard assessments	Driving pledge/ rules Health & wellbeing Monitor Correct	Risk assess Selection Specification Intelligent transport Systems(its) and telematics to monitor	External benchmarking External communications Family members program Community involvement Engaging other road users Road safety weeks /days Safety/eco groups European road safety Charter Road safety conference presentations Media/outreach/PR Safety & environmental achievement awards
At scene					ITS data capture	Escalation process
Post-Crash	Change management Process Ongoing claims data analysis Data warehousing& Linkages Evaluation, KPI Benchmarking& program development	Debrief and review Review journey elements of collision data Ongoing journey management review	Review site/ road elements of collision data	Review people elements of collision data Reassess/train	Investigate ITS data	Manage reputation and community learning process

Phase 1: HADDON Matrix Results

Determining what the best practices are can be identified through the process of the HADDON matrix that is a continuous systematic process for evaluating the products, services, and work processes of organizations that are recognized as representing best practices for the purpose of organizational improvement [14].

The results of the application of the HADDON matrix to the Oil Company are presented in the table 2. These selected factors are studied by the method of the influences networks for the importance evaluation.

Phase 2: Network Influence Results

The application of the first method (The HADDON Matrix) allowed us to determine the distance between the practices of the company and the best practice. Given that the objective of the use of the matrix HADDON is to minimize the damages owed to the road risk in the company; for an important distance on several shutters, it is difficult of determined which are the main shutters which contribute to the insecurity long-distance truck driver in the company and the reduction of distance of which allows of minimize the damage.

The use of the influence network method permitted to remedy this problem; she revealing the elements which contribute to the insecurity long-distance truck driver, she allows to determine the ways of influence between the various levels "Fig. 1"and allowed also in determined the most effective ways for the control of road risk in company. The

progress of the workshop is realized according to the stages below:

a. Revealing of factors and weighting

After the examination of initial network the group discussed factors at risk by holding in account the way with which the fleet of the company is exploited. The major part of vehicles is exploited by the workers who drive to execute their tasks on the big territory of the company. A part of the movements are made to execute tasks beforehand scheduled but the problem settles of made that an important part of the movements are made within the framework of the interventions on well and distant unit.

For the material shutter the team underlined the renewal of the fleet of the company what minimizes the influence of the material shutter on the road risk, but the team preferred to take into account the maintenance of vehicles which assures the durability of the park state.

For the shutter environment the group agreed to confederate the roads design and to consider partially that the marked roads are built by the company.

b. Influence Ways

The influences on the direct factors were classified in ascending order (high, averagely high and average) according to number of factors that they influence the upper level. Every factor is marked with the factors of upper level judged as influenced by this factor.

c. Control measure

After the finalization of the network, the group proposes the reduction measure of priority for the risk control; by basing itself on the available data, the statistics of the accidents, the state of the park and practice of the company.

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