

## **ISO 39001 ROAD TRAFFIC SAFETY (RTS) MANAGEMENT SYSTEMS – EXPERIENCES FROM EARLY ADOPTERS IN THE SWEDISH TRANSPORT INDUSTRY**

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### **Abstract**

Systematic road safety work contributes to the company's profitability. This was one finding in a survey conducted by the Swedish Association of Road Transport Companies (SA) among 141 road transport companies that carry out systematic road traffic safety work. In 2003, the SA produced a Road Traffic Safety standard (SA-RTS) based on the management principles in the ISO 14001 standard and has certified a large number of companies according to this standard. As far as the companies' profitability is concerned, approximately 40 per cent state in survey responses that it is good or very good and 72 per cent states that SA-RTS contribute to the company's profitability at a high or the highest possible level of fulfilment. The fulfilment of objectives at companies holding SA-RTS certification is high or very high. Swedish road transport company Närkefrakt is probably the first company in the world to be certified 28 March 2012 according to the draft international RTS standard (DIS) ISO 39001.

**Keywords:** ISO 39001, RTS, SA-RTS, Road Traffic Safety, HGV, heavy vehicle, management system, audit, traffic accident, fatalities, injuries

## **1. Introduction**

Every road accident is one too many. As road safety is of increasing concern to civil societies and governments in the world, greater emphasis should be put on improved infrastructure, vehicle condition and driver professionalism through training within the road transport sector.

A prerequisite to reducing road accidents is thus to improve all stakeholders knowledge, including policy-makers, road safety researchers, manufacturers, truck operators, professional drivers and all other road users on the main causes of traffic accidents.

In many countries, only limited reliable information or dedicated statistics are available regarding accidents involving commercial vehicles. Moreover, the involvement of a commercial vehicle in an accident does not necessarily imply that the commercial vehicle has caused the accident. With limited resources, policy measures must be implemented that effectively target the main causes of accidents.

## **2. Research method**

### **2.1. Experiences from SA-RTS Auditing**

The SA performs audit according to ISO 9001 Quality Management System and ISO 14001 Environment Management System. Furthermore the SA has developed a Road Traffic Safety standard, SA-RTS, which since 2003 has been implemented in 141 Swedish road transport companies. The SA-RTS standard is based on the management principles of ISO 14001, but focuses on RTS factors.

This report presents a survey conducted in February 2012 at 141 road transport companies holding SA-RTS certification.

### **2.2. Experiences from Development and Implementation of ISO 39001**

Experiences from early adopters of SA-RTS in the Swedish transport industry have been used by SA to support the ISO PC 241 for the development of ISO 39001.

Some important differences in management principles are identified in ISO 39001 as compared to ISO 14001.

Methods have been developed by SA for the analysis of the RTS factors, elements and criteria, exposure risks and determination of objectives and targets. These can be implemented in the trucking business to contribute to reduced risk of being killed or seriously injured in traffic.

SA support measures to accelerate the ISO 39001 implementation work with RTS in transport companies and carry out audits and certification based on the Draft International Standard

(DIS) ISO 39001 from 2012. As soon as the standard has been adopted in the end of 2012, the audits will be based on ISO 39001.

On 28 March 2012, SA certified the first company, Närkefrakt, according to the DIS ISO 39001 standard. The method for risk analysis has been tested at Närkefrakt and was the basis for decisions on RTS measures and targets.

### 3. RTS in Sweden and in the European Union

The European Commission's White Paper states the objectives of moving close to zero fatalities in road transport by 2050. In line with this goal, the EU aims at halving road casualties by 2020.

In 2010 there were approximately 2.8 road traffic fatalities (Table 1) per 100,000 inhabitants in Sweden. The corresponding figure in the EU for 2010 was an average of 6.2 fatalities per 100,000 inhabitants.

Fatalities from road traffic in Sweden has decreased from 471 people in 2007 to 283 people in 2010 and then increased to 342 in 2011.

Trucks are involved in approximately 20 per cent of fatal accidents in Sweden which, in 2010, involved a total of 57 people, of which 53 were killed by trucks and 4 were killed travelling in a truck. In 2011, 63 were killed by trucks and 3 were killed travelling in a truck.

This means that significantly more other road users are killed than people travelling in a truck.

**Table 1 – Fatalities in Road Traffic Accidents in Sweden.**

	2007	2008	2009	2010	2011
Fatalities (2010, 2011 excl suicides)	471	397	358	266	319
By HGV	92	74	50	53	63
In HGV	6	4	2	4	3
Fatalities with HGV	98	78	52	57	66
HGV involved	21%	20%	15%	20%	20%
In oncoming traffic	52	36	28	26	27
Fatalities in oncoming traffic	53%	46%	54%	46%	41%
Fatalities per 100,000 inhabitants	4,7			2.8	3.4
Suicides (Trafikanalys 2012:4)				17	23

At least six per cent of the road traffic fatalities are considered to be caused by a deliberate act, i.e. suicide. As far as suicide is concerned, the number of unrecorded cases is high because the cause of an accident cannot always be clearly identified.

Almost half the fatal accidents involving trucks – 46 per cent in 2010 – occur when there is oncoming traffic. According to Trafikverket [the Swedish National Transport Administration], the risk of being killed on the roads, per distance travelled, is 4 times higher when there is oncoming traffic than when there is no oncoming traffic. This means that elimination of risks involving oncoming traffic is an important measure to improve road safety. This may be achieved, for example, by building motorways or by installing systems for separating traffic on existing roads.

### **3.1. European Truck Accident Causation**

The scientific European Truck Accident Causation study, co-funded by the IRU and the European Commission in 2007, has investigated on site over 620 accidents involving trucks in seven European countries, and concluded that 85 percent of all accidents are mainly caused by human error. However, out of those 85 percent, 75 percent are caused by other road users against 25 percent by the truck driver. In-depth analysis shows that when the human being caused the accident, non-adapted speed, failure to observe intersection rules and improper maneuvering when changing lanes are the main cause. Truck load and fatigue play only a minor role. One of the concluding recommendations is that improving driver training and upgrade driving school programs are key to improving road safety.

### **3.2. Excerpts from the EU WHITE PAPER**

SA's measures and objectives on road traffic safety take into account the roadmap stated by the EU's white paper. Below are some points that are excerpts from the texts of the EU White Paper "ROADMAP TO A SINGLE EUROPEAN TRANSPORT AREA — TOWARDS A COMPETITIVE AND RESOURCE - EFFICIENT TRANSPORT SYSTEM"

- (18) Curbing mobility is not an option.
- (24) Freight shipments over short and medium distances (below some 300 km) will to a considerable extent remain on trucks.
- (33) The interface between long-distance and last-mile freight transport should be organised more efficiently.
- (9) By 2050, move close to zero fatalities in road transport. In line with this goal, the EU aims at halving road casualties by 2020. Make sure that the EU is a world leader in safety and security of transport in all modes of transport.
- (40) Even though the number of road fatalities in the EU was almost halved in the past decade, 34,500 people were killed on EU roads in 2009. Initiatives in the area of technology, enforcement, education and particular attention to vulnerable road users will be key to drastically reduce these losses of life even further.
- Annex: List of initiatives
  - 16. Towards a 'zero-vision' on road safety
    - Harmonise and deploy road safety technology — such as driver assistance systems, (smart) speed limiters, seat belt reminders, eCall, cooperative systems and vehicle-infrastructure interfaces — as well as improved roadworthiness tests including for alternative propulsion systems.

- Develop a comprehensive strategy of action on road injuries and emergency services, including common definitions and standard classifications of injuries and fatalities, in view of adopting an injuries reduction target.
- Focus on training and education of all users; promote the use of safety equipment (seat belts, protective clothes, anti-tampering).
- Pay particular attention to vulnerable users such as pedestrians, cyclists and motorcyclists, including through safer infrastructure and vehicle technologies.

#### **4. Management system certification in the haulage industry**

The SA certifies management systems in the areas of quality, environment, road traffic safety and systematic work environment management. A total of approximately 600 certificates have been issued by SA, which each year also follows up the certificates with a third-party audit. Most companies have several certificates, the most common certification being in accordance with ISO 14001 Environmental Management Systems, followed by ISO 9001 Quality Management Systems.

In 2003 SA produced a Road Traffic Safety standard (SA-RTS) based on the management principles in the ISO 14001 standard and has certified a large number of companies according to this standard. RTS factors such as legal speed limits, use of seat belts and being drug-free while driving as well as policies, objectives, monitoring and corrective and preventive measures are managed according to known principles for management systems within the framework of the SA-RTS standard.

In order to follow up the results of road traffic safety work, a questionnaire survey was carried out in February 2012 amongst 141 SA-RTS-certified companies. The response rate was 75 percent, which in the circumstances is a high response rate. These certified companies include management systems for a number of sub-contractors with many employees and a large number of vehicles. In total, the survey covered road traffic safety work in 1,137 companies with a total of 7,763 employees and 5,443 vehicles.

These 141 companies will be certified in accordance with ISO 39001 once that standard has been established and published.

#### **5. Road safety survey amongst SA RTS-certified companies**

The road traffic safety survey was conducted from 02.02.2012 to 14.02.2012 and responses were received from 93 out of 141 companies in the group of selected road traffic safety-certified companies. The average experience of SA-RTS management systems for working with road traffic safety is six years.

### **5.1. Type of company included in the survey**

The certified companies are small, having just a few employees. A third of them have between 40 and 100 employees, and a quarter of them have between 20 and 40 employees. Of the companies included in the survey, approximately 20 percent are transport service companies or similar operations. Of the certified companies, 60 percent have fewer than 30 goods vehicles.

Most of the SA-RTS-certified companies also have environmental management certification in accordance with ISO 14001 and quality management certification in accordance with ISO 9001. This means that these companies are very familiar with working with management systems. The companies also indicate that they place a high priority on implementation of ISO 39001.

Most of the SA-RTS companies provide transport services locally, regionally or nationally. Only 3 percent operate abroad. Several of the companies have a number of different activities. The largest main activities for certified companies in Sweden:

- Local distribution/depot-based routes
- Long-distance routes
- Construction and civil engineering transport
- Agricultural transport
- Temperature-controlled transports

As far as the companies' profitability is concerned, approximately 40 per cent state that it is good or very good. 40 per cent of the companies state that their profitability is satisfactory.

### **5.2. Experience in SA RTS certified companies**

The survey asked what was most difficult in the company's work on road safety.

Examples of problems in the companies' work with road safety are:

- To set measurable targets and to evaluate the outcome of actions.
- To obey speed limits and use the seatbelt.
- To reach the target of zero accidents and incidents.
- To have time enough to take all measures

The companies in the survey have also been given the opportunity to give their most important advice to other road users to improve road safety:

- Use a seat belt and drive at the correct speed.
- Have respect for everyone on the road.
- Increasing your speed will not save you much time, so keep to the speed limit.
- Implement safety policies among staff.
- Clear requirements.
- Give feedback.
- Set a good example to others.

### **5.3. What has been achieved in SA RTS certified companies**

#### ***Fatalities and serious injuries per year***

According to figures derived from the survey responses, since certification of road traffic safety work began an average of 3.6 persons have died and 7.5 persons have been seriously injured each year in road traffic accidents involving these certified company.

The numbers are underestimated as it is difficult to subsequently account for what has happened over the last six years. Compared with 2010 when trucks were involved in a total of 57 fatalities, the certified group accounts for about 6 percent of these fatalities.

The companies employ approximately 7,800 people directly or indirectly through other forms of cooperation such as via common market organisations such as lastbilcentral.

#### ***Road safety – a profitable business***

Systematic road safety work contributes to the company's profitability. This was one finding in the survey.

Approximately 40 per cent state in survey responses that profitability is good or very good and 72 per cent states that SA-RTS contribute to the company's profitability at a high or the highest possible level of fulfilment.

#### ***Fulfilment of RTS Objectives***

According to the companies' responses in the survey, setting measurable goals and monitoring the results of measures are examples of the difficulties involved in road traffic safety work. The four most common RTS factors that are within the companies' control are speed, use of seat belts, minimising the risk of accidents and driving and rest periods, in that order.

Number of survey responses per RTS factor:

- 35 comply with speed limits.
- 20 use of safety belt.
- 17 minimise risks of accidents.
- 12 comply with driving and rest periods.
- 10 alcolock device, alcohol and drugs.
- 9 comply with regulations.

The fulfilment of objectives at companies holding road traffic safety certification is high or very high:

- Road traffic safety work – 84 per cent of companies holding road traffic safety certification state that they have a high or the highest possible level of fulfilment.
- Use of seat belts – 85 per cent state that they have a high or the highest possible level of fulfilment
- Comply with speed limits – 84 per cent state that they have a high or the highest possible level of fulfilment.
- Comply with rules on overloading – 85 per cent state that they have a high or the highest possible level of fulfilment

- The right vehicle for the job – 94 per cent state that they have a high or the highest possible level of fulfilment.
- Fault-free vehicles – 82 per cent state that they have a high or the highest possible level of fulfilment.
- Comply with driving and rest periods – 89 per cent state that they have a high or the highest possible level of fulfilment.
- Fitness and health of drivers – 71 per cent state that they have a high or the highest possible level of fulfilment.
- Minimise the number of accidents – 88 per cent state that they have a high or the highest possible level of fulfilment.
- Contribute to customer satisfaction – 84 per cent state that they have a high or the highest possible level of fulfilment.
- Contribute to the company's profitability – 72 per cent state that they have a high or the highest possible level of fulfilment.

## **6. ISO 39001 Road Traffic Safety (RTS) Management Systems**

The draft international Standard (DIS) ISO 39001 specifies requirements for a Road Traffic Safety (RTS) management system to enable an organization that interacts with the road traffic system to reduce death and serious injuries related to road traffic crashes.

Final vote on the international standard FDIS ISO 39001 occurs during July-August 2012. After approval it will be released in November 2012 and the ISO 39001 can be ordered from your national standardization body.

The requirements in the standard include development and implementation of an RTS policy, development of objectives which take into account legal and other requirements and information about elements and criteria related to RTS that the organization identifies as those which it can control and influence.

All stakeholders in the road traffic system should take measures and responsibility of their own part of the RTS and collaborate with other parties. The ISO 39001 will be a good standard and guidance on this process. Companies that have experiences from implemented management systems such as ISO 9001 Quality, or ISO 14001 Environment can relatively easily integrate ISO 39001 RTS in its operations.

New features in the standard as compared with management systems for other areas include the following:

- ISO 39001 will be the first standard with a new common structure and chapter division which will gradually be introduced into other management systems, e.g. ISO 9001 and ISO 14001.
- The common structure is augmented by anything that requires particular emphasis in road traffic safety.



- Senior management have been given an expanded and clear responsibility to set a good example and to ensure that the entire management system has been implemented and is effective.
- Road safety factors that everyone must pay attention to are pointed out in important areas such as safe roads, safe vehicles and safe road users and emergency preparedness.
- The organization shall establish, implement and maintain a procedure(s) to record, investigate and analyze those road traffic crashes and other incidents in which they are involved that lead, or have the potential to lead, to death and serious injuries of road users.

## 7. Road traffic safety risk analysis method

Risk analyses are required in order to be able to assess road traffic safety factors in accordance with requirements contained in ISO 39001 and to decide on appropriate targets and action plans. A lot of people have been driving goods vehicles their whole lives without being involved in fatal accidents or accidents involving serious injury. The risk of anything happening to the individual driver or vehicle may therefore be perceived as small. However, if anything does happen, then the consequences can be serious. In order to make it easier to evaluate the risks, a risk analysis should be performed that involves a large number of drivers over fairly long time periods. Small companies should perform risk analyses extending 10-20 years into the future in order to improve understanding of the existence of long-term road traffic safety risks.

SA has developed a risk analysis method, formula (1), which can be used by road transport companies to analyse risks involved in road traffic that may contribute to personal injury or a risk of being killed while driving. There are a number of other methods, though these are not reported on here. Risk analysis in road traffic safety according to formula (1) involves assessment of both the risk of something happening and the consequences of the event. The risk (R) expressed as per mil (0-1,000) is the likelihood (L) as a percentage (0-100) of a consequence occurring on a scale (0-10) multiplied by the factor (C) for the consequence.

$$R = LC \quad (1)$$

where R= risk as per mil (0-1,000)  
 L= Likelihood as a percentage of a consequence occurring (0-100)  
 C= 1 = incident with a risk of injury  
 2 = very little injury  
 3 = slight injury  
 4 = injury  
 5 = injuries  
 6 = substantial injuries  
 7 = very substantial injuries  
 8 = serious injuries  
 9 = very serious injuries  
 10 = death

With regard to consequence  $C = 8, 9$  and  $10$  in formula (1), it can be confirmed that the greatest possible risk of something occurring is 800 per mil for serious injury, 900 per mil for very serious injury, whereas 1,000 per mil implies death. Road safety work can affect likelihood and consequence, thus altering risk. The objective is for the risk of an undesired event expressed in per mil to be as low as possible. If the risks of several different events are added together, then the total could potentially be more than 1,000 per mil. However that does not mean an immediate risk of death. The numerical value for risk is however a good tool for assessing risks in relative figures. ISO 39001 focuses on eliminating the risk of someone dying or being severely injured while driving.

ISO 39001 contains a list of road traffic safety factors which every company must analyse in order to assess risks, before coming up with targets and deciding on action plans. The road traffic safety factors include the areas of safe roads, safe road users, safe drivers and emergency planning.

The following guiding principles should apply to prioritising road traffic safety targets and action plans:

- minimising high risk,
- minimising numbers of risks,
- minimising serious consequences, and
- adhering to statutory requirements and customer requirements.

The analysis conducted by Närkefrakt confirmed oncoming traffic to be the greatest risk, followed by the risk of speed linked to reaction time and braking distance.

Table 2 shows examples of road traffic safety factors, risks and targets which the organisation itself can affect and control, e.g. legal speed, seatbelt usage, sobriety and hands-free phones. Factors the organisation has no control over, such as oncoming traffic and road friction, can only be affected by e.g. lobbying decision-makers.

Example 1, Table 2 A: In the case of the road traffic safety factor legal speed limit, assume that there is a 4 percent likelihood of someone dying if the legal speed limit is not adhered to in traffic. The risk will be 40 per mil, and actions within the organisation could be e.g. lowering the speed limiter from 89 kph to 83 kph.

Example 2, Table 2 F: In 2010, oncoming traffic was responsible for 46 percent of deaths where a goods vehicle was involved. The risk of someone dying during this period is 30 percent. The risk will be 300 per mil. Individual companies are unable to take any actions for improving lane separation.

Example 3, Table 2 G: Another important road traffic safety factor, seen by road transport companies as a road traffic safety risk, is poor road surfaces and low friction. Road authorities can help improve road traffic safety by means of good winter road maintenance, plowing, gritting and applying salt.

Not only road users but all transport stakeholders must accept their share of responsibility for safer traffic. Examples of RTS risks (Granlund) that the road authority should deal with are: separation from oncoming traffic, vulnerable road users, speed limits – especially curve speed management, design of road cross section and super elevation in curves, water drainage gradient in transition curves, maintenance, surface texture and friction, the design of crash barriers and their end terminals, entrances and exits, side areas / safety zone and intersection design etc.

**Table 2 - RTS Factors, Risks and Targets.**

Examples of RTS Factors , Risks and Targets					
	RTS factors	Risk R (‰)	L (%)	C	Target
A	Legal speed	40	4	10	<83 km/h
B	Use of safety belt	30	3	10	> 85 per cent
D	No drugs	20	2	10	Alcolock
E	Handsfree	200	25	8	Bluetooth
F	Oncoming traffic	300	30	10	Lobbying
G	Road surface texture, friction	270	30	9	Lobbying

## 8. Conclusion

Systematic road safety work contributes to the company's profitability. This was one finding in a survey conducted by the Swedish Association of Road Transport Companies (SA) among 141 road transport companies that carry out systematic road traffic safety work.

In 2003, the SA produced a Road Traffic Safety standard (SA-RTS) based on the management principles in the ISO 14001 standard and has certified a large number of companies according to this standard. RTS factors such as legal speed limits, use of seat belts and being drug-free while driving as well as policies, objectives, monitoring and corrective and preventive measures are managed according to known principles for management systems within the framework of the SA-RTS standard. As far as the companies' profitability is concerned, approximately 40 per cent state in survey responses that it is good or very good and 72 per cent states that SA-RTS contribute to the company's profitability at a high or the highest possible level of fulfilment. The fulfilment of objectives at companies holding SA-RTS certification is high or very high. Swedish road transport company Närkefrakt is probably the first company in the world to be certified 28 March 2012 according to the draft international RTS standard (DIS) ISO 39001.

When elements and criteria related to RTS that the organization identifies as those which it can control and influence, are analyzed with respect to the risk being killed or seriously injured in road traffic, there is a very little RTS risk exposure to individuals or individual companies over the shorter time horizon which is normally handled in transport companies. To analyze relevant RTS output in transport companies, risk assessment needs to be applied to

long periods of time eg, 10-20 years or more, and applied for many drivers. This focus on the long time output makes it easy to see that all the individual small steps can cumulatively have a significant impact on RTS.

Therefore it is also important to broaden the work on RTS objectives to other relevant stakeholders. Not only the driver and the carrier should focus on RTS. The infrastructure providers have a key role to address RTS in their own organization.

In the case of drivers and transport companies work with RTS, the following examples of important factors should be in focus, speeding, seat belt use, securing of cargo, to see and be seen, fitness of drivers especially considering fatigue, distraction, alcohol and drugs.

With regard to infrastructure owners: separation from oncoming traffic, vulnerable road users, speed limits – especially curve speed management, design of road cross section and super elevation in curves, water drainage gradient in transition curves, maintenance, surface texture and friction, the design of crash barriers and their end terminals, entrances and exits, side areas / safety zone and intersection design etc.

RTS is created jointly by several parties in collaboration, the driver, carrier, customer, vehicle manufacturers and infrastructure providers. All stakeholders in the road traffic system should take measures and responsibility for their own part of the RTS and collaborate with other parties. The ISO 39001 shall be used as the standard and guidance on this process jointly with training and education of all road users.

Systematic road traffic safety work based on known ISO management principles leads to a highly satisfactory outcome for both the company itself and, naturally, for society. The fact that the company's customers are satisfied also means that everyone is a winner in road safety work.

The companies in the survey have also been given the opportunity to give their most important advice to other road users to improve road safety:

- Use a seat belt and drive at the correct speed
- Have respect for everyone on the road
- Increasing your speed will not save you much time, so keep to the speed limit.
- Set a good example to others.

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