

**PETRONAS TECHNICAL STANDARDS**  
**HEALTH, SAFETY AND ENVIRONMENT**

**ROAD TRANSPORT SAFETY MANAGEMENT**  
**(GUIDELINE)**

**PTS 60.2402**  
**OCTOBER 2006**



## PREFACE

PETRONAS Technical Standards (PTS) are based on the experience acquired during the involvement with the design, construction, operation and maintenance of processing units and facilities. Where appropriate they are based on, or reference is made to, national and international standards and codes of practice. The objective is to set the recommended standard for good technical practice applied by PETRONAS in oil and gas production facilities, oil refinery, gas processing, chemical plants, marketing facilities or any other such facility, and thereby to achieve maximum technical and economic benefit from standardisation.

The information set forth in these publications is provided to users for their consideration and decision to implement. This is of particular importance where PTS may not cover every requirement or diversity of condition at each locality. The system of PTS is expected to be sufficiently flexible to allow individual operating units to adapt the information set forth in PTS to their own environment and requirements.

When Contractors or Manufacturers/Suppliers use PTS they shall be solely responsible for the quality of work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the Principal will expect them to follow those design and engineering practices which will achieve the same level of integrity as reflected in the PTS. If in doubt, the Contractor or Manufacturer/Supplier shall, without detracting from his own responsibility, consult the Principal or its technical advisor.

The right to use PTS rests with three categories of users:

- 1) PETRONAS and its affiliates.
- 2) Other parties who are authorised to use PTS subject to appropriate contractual arrangements.
- 3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) and 2) which requires that tenders for projects, materials supplied or generally work performed on behalf of the said users comply with the relevant standards.

Subject to any particular terms and conditions as may be set forth in specific agreements with users, PETRONAS disclaims any liability of whatsoever nature for any damage (including injury or death) suffered by any company or person whomsoever as a result of or in connection with the use, application or implementation of any PTS, combination of PTS or any part thereof. The benefit of this disclaimer shall inure in all respects to PETRONAS and/or any company affiliated to PETRONAS that may issue PTS or require the use of PTS.

Without prejudice to any specific terms in respect to confidentiality under relevant contractual arrangements, PTS shall not, without the prior written consent of PETRONAS, be disclosed by users to any company or person whomsoever and the PTSs shall be used exclusively for the purpose they have been provided to the user. They shall be returned after use, including any copies, which shall only be made by users with the express prior written consent of PETRONAS. The copyright of PTS vests in PETRONAS. Users shall arrange for PTS to be held in safe custody and PETRONAS may at any time require information satisfactory to PETRONAS in order to ascertain how users implement this requirement.

## AMENDMENTS RECORD SHEET

| Chap. No. | Sect No. | Description                                                 | Issue No. | Date         | Rev No. | Date         | App by: (initial) |
|-----------|----------|-------------------------------------------------------------|-----------|--------------|---------|--------------|-------------------|
| All       | All      | New PTS 60.2402 Road Transport Safety Management Guidelines | 1         | October 2006 | 0       | October 2006 | IGA               |

This is a controlled document and is also available on the CHSE Website

### ACKNOWLEDGEMENT

This document was jointly prepared with contribution from the following organisations:

1. CHSE Morris Kho  
Busari Jabar  
Shairizal Badzri  
Mohd Farid Nazri
2. PDB M Shobri Abu Bakar  
Hairudin Hashim
3. PF(K)SB A Aleem Sidek M Ali
4. EPMSB Sazali Abu Kassim
5. MISC Ramlee Hussin  
Noraini Muhammad
6. BPPA Jaffar Embong
7. BASF Mohd Faudzi Hussin  
Ismail Md Noh
8. OPTIMAL Jayaram Sinathamby

# TABLE OF CONTENTS

|                                                                                  |           |
|----------------------------------------------------------------------------------|-----------|
| <b>PREFACE</b>                                                                   | <b>2</b>  |
| <b>AMENDMENTS RECORD SHEET</b>                                                   | <b>3</b>  |
| <b>TABLE OF CONTENTS</b>                                                         | <b>4</b>  |
| <b>FOREWORD</b>                                                                  | <b>7</b>  |
| <b>INTRODUCTION</b>                                                              | <b>8</b>  |
| <b>1. LEADERSHIP AND COMMITMENT</b>                                              | <b>10</b> |
| <b>2. GUIDING PRINCIPLES AND STRATEGIC OBJECTIVES</b>                            | <b>12</b> |
| 2.1 Guiding Principles on Land Transportation Safety                             | 12        |
| 2.2 Strategic Objectives                                                         | 12        |
| <b>3. ORGANISATION, RESPONSIBILITIES, RESOURCES, STANDARDS AND DOCUMENTATION</b> | <b>13</b> |
| 3.1 Organisation                                                                 | 13        |
| 3.2 Responsibilities and Resources                                               | 13        |
| 3.3 Competencies                                                                 | 13        |
| 3.4 Training                                                                     | 14        |
| 3.4.1 HGV Driver Induction Training                                              | 15        |
| 3.4.2 Use of Mentor Drivers for Training and Coaching                            | 17        |
| 3.4.3 HGV Driver Training                                                        | 17        |
| 3.4.4 Defensive Driving                                                          | 18        |
| 3.4.5 Refresher Training                                                         | 19        |
| 3.5 Communication                                                                | 19        |
| 3.5.1 Communication Systems                                                      | 20        |
| 3.5.2 Communications in an emergency/crisis                                      | 22        |
| 3.5.3 HSE Committee/Road Safety Committee                                        | 22        |
| 3.5.4 Formal Driver Meetings                                                     | 23        |
| 3.5.5 Tool box Meetings                                                          | 24        |
| 3.5.6 Road Safety Promotion                                                      | 24        |
| 3.6 Standards                                                                    | 25        |
| 3.6.1 Legislation                                                                | 26        |
| 3.7 Documentation                                                                | 26        |
| 3.7.1 RTS Guideline Documentation Layout                                         | 26        |
| 3.7.2 Document Control                                                           | 29        |
| <b>4. HAZARDS AND EFFECTS MANAGEMENT PROCESS (HEMP)</b>                          | <b>31</b> |
| 4.1 Identifying Hazards and Hazardous Events                                     | 31        |
| 4.2 Assessing the Risks                                                          | 32        |
| 4.2.1 Identifying Threats                                                        | 32        |
| 4.2.2 Risk Assessment                                                            | 36        |
| 4.2.3 Contractor Risk Appraisal                                                  | 37        |

|                   |                                                              |           |
|-------------------|--------------------------------------------------------------|-----------|
| 4.3               | Controls to Reduce Risk                                      | 37        |
| 4.3.1             | Road Exposure Reduction                                      | 38        |
| 4.3.2             | Operational Risk Reduction Measures                          | 38        |
| 4.4               | Recovery                                                     | 38        |
| <b>5.</b>         | <b>ROAD SAFETY PLANNING AND PROCEDURES</b>                   | <b>40</b> |
| 5.1               | Contractors and Contracts                                    | 40        |
| 5.2               | Driver Management Procedures                                 | 41        |
| 5.2.1             | Driver Selection                                             | 42        |
| 5.2.2             | Employment terms and conditions                              | 44        |
| 5.3               | Journey Management Procedures                                | 46        |
| 5.3.1             | Electric Tachographs and Speed Limiters                      | 47        |
| 5.3.2             | Drivers Hours                                                | 47        |
| 5.4               | Emergency Response Plans and Procedures                      | 48        |
| 5.5               | Medical Emergency Procedures                                 | 50        |
| 5.6               | Incident Investigation and Reporting Procedures              | 51        |
| 5.7               | Housekeeping                                                 | 51        |
| 5.8               | Vehicle and Equipment Procedures                             | 52        |
| 5.9               | General Freight Movements                                    | 53        |
| 5.10              | Management of Change                                         | 54        |
| <b>6.</b>         | <b>IMPLEMENTATION, MONITORING AND CORRECTIVE ACTION</b>      | <b>55</b> |
| 6.1               | Monitoring                                                   | 55        |
| 6.2               | Records                                                      | 57        |
| 6.3               | Corrective Action                                            | 57        |
| <b>7.</b>         | <b>ASSURANCE</b>                                             | <b>60</b> |
| 7.1               | Assurance Programmes                                         | 60        |
| 7.2               | Corrective Actions following Assurances                      | 61        |
| <b>8.</b>         | <b>MANAGEMENT REVIEW</b>                                     | <b>63</b> |
| <b>APPENDIX 1</b> | <b>ROAD TRANSPORT GUIDELINES AND PUBLICATIONS</b>            | <b>64</b> |
| <b>APPENDIX 2</b> | <b>DRIVERS HANDBOOK - CONTENTS LIST</b>                      | <b>68</b> |
| <b>APPENDIX 3</b> | <b>RECOMMENDED MAXIMUM DRIVING AND DUTY HOURS</b>            | <b>70</b> |
| <b>APPENDIX 4</b> | <b>VEHICLE SELECTION AND SAFETY FEATURES</b>                 | <b>71</b> |
| <b>APPENDIX 5</b> | <b>CARE AND MAINTENANCE OF VEHICLES</b>                      | <b>75</b> |
| <b>APPENDIX 6</b> | <b>CONTRACT FOR TRANSPORT AND BULK DELIVERY</b>              | <b>77</b> |
| <b>APPENDIX 7</b> | <b>MODEL ROAD ACCIDENT REPORT LAYOUT AND TRIPOD ANALYSIS</b> | <b>93</b> |

|                                                                    |            |
|--------------------------------------------------------------------|------------|
| <b>APPENDIX 8 DRIVING PERFORMANCE CHECKLIST</b>                    | <b>101</b> |
| <b>APPENDIX 9 PRESCRIBED MEDICATION AND FITNESS FOR WORK</b>       | <b>102</b> |
| <b>APPENDIX 10 MODEL COMMERCIAL DRIVERS HEALTH ASSESSMENT FORM</b> | <b>105</b> |
| <b>APPENDIX 11 FATIGUE MANAGEMENT</b>                              | <b>109</b> |
| <b>GLOSSARY</b>                                                    | <b>124</b> |

## **FOREWORD**

Road accidents dominate the fatality statistics of PETRONAS companies. The main area of concern is the high level of third party fatalities associated with bulk tanker and lorry incidents.

The implementation of a Road Transport Safety Guideline (RTS Guideline), based on Group HSE-MS guidelines, will provide a systematic approach in the management of road safety. Moreover, the RTS Guideline will establish a framework for continuous improvement in road safety performance and will form an essential part of an OPU/JV overall HSE Management System.

This guideline can be used in the development of an RTS Guideline for trucking operations but the same structured approach can be applied to other transport activities.

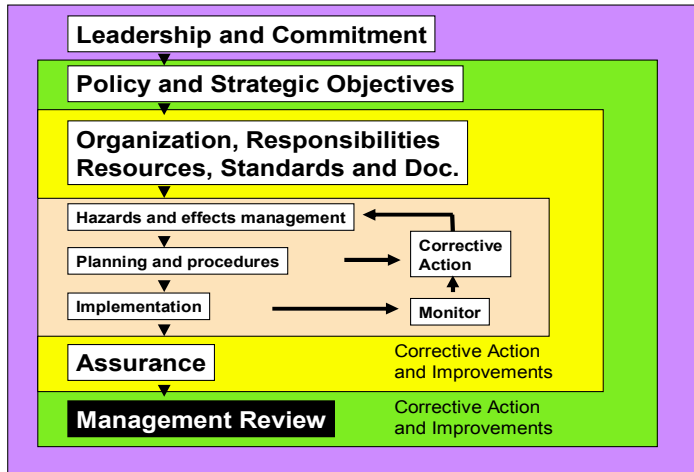
The RTS Guideline should also cover environmental and occupational health aspects relating to road transportation activities.

The behaviour of PETRONAS drivers on the road and the condition of their vehicles will reflect the image of PETRONAS OPU/JV and the Group as a whole. The importance of communicating the roles of the drivers as a frontline staff of PETRONAS needs to be reinforced through regular training and briefing.

## INTRODUCTION

The objective of this document is to provide guidance on implementation of Road Transport Safety for Heavy Goods Vehicles (HGV's) which is consistent with the Group guidelines on "HSE Management System". The Road Transport Safety Guideline (RTS Guideline) should form part of an OPU/JV HSE-MS, the main elements of which are shown in Figure 1.

**Figure 1 Model HSE Management System**

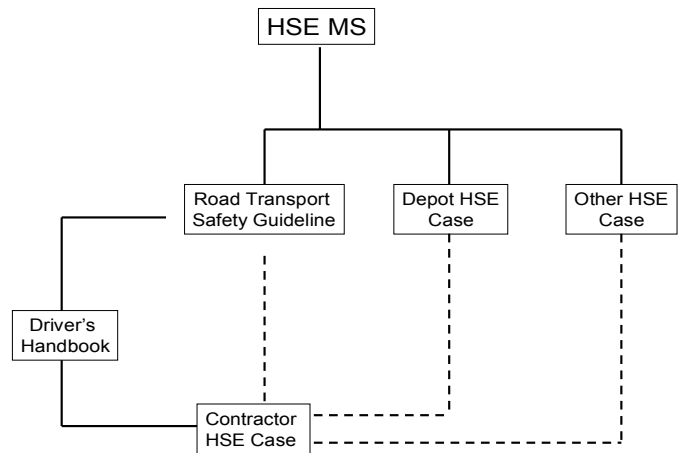


Road safety is a challenge which needs to be proactively managed in the same way as any other business activities. It requires commitment from the top, competent line managers and in the case of contracted fleets, designated contract holders. Company road transportation contractors should implement an RTS Guideline which is consistent with Group guidelines. Regular assurances will ensure that RTS Guideline are in place and adequate to meet the business requirements.

The documented RTS Guideline is the HSE Case for road transportation in HSE MS.

This guideline is limited to the safe driving activities of HGV operations and excludes loading and discharging as they will normally form part of other HSE Cases (e.g. Worksite HSE Case). A road transportation contractor, however, should develop a RTS Guideline covering all aspects of road transportation. Similarly, the drivers handbook should also include loading and discharge operations. Fig. 2 shows the relationship between the company HSE-MS and related HSE Cases.

**Figure 2 Road Transport Safety Guideline**



## 1. LEADERSHIP AND COMMITMENT

Senior Management must demonstrate visible leadership and commitment through the development of appropriate procedures and ensure subsequent effective implementation.

The OPU/JV should create and sustain a culture that supports effective implementation of the RTS Guideline based on:

- OPU/JV commitment to continuous improvement in road safety performance
- **motivation** of staff and contractors to improve personal road safety performance
- **acceptance** of personal responsibility and accountability for safety performance by staff and contractors
- **active participation** and involvement at all levels

Leadership and commitment is demonstrated when management, staff and contractors at all levels:

- set a good example in terms of their own behaviours and driving performance
- establish standards and procedures which are in line with the OPU/JV RTS Guideline
- provide an effective organisation to manage road transport safety including adequate, competent human resources with clearly defined accountabilities and responsibilities
- allocate adequate resources to manage road transportation and related strategic logistic issues
- clearly communicate the expectations and requirements of RTS Guideline through regular briefing and training to drivers and staff on road transportation safety
- implement rewards and recognition scheme to promote safe driving behaviour and institute consequence management for serious or repeated breaches of major safety rules
- chair regular HSE/Road Safety Committee meetings involving OPU/JV employees and contractors
- put road safety matters high on the agenda of meetings, including board meetings
- solicit employees' and contractors' suggestions on measures to improve safety

performance

- set targets, measure and monitor road safety performance
- contribute towards improvement of national road safety standards by participating in industry committees, external conferences and public awareness programmes.
- wear appropriate clothing and required Personal Protective Equipment (PPE)
- participate in accident investigation teams (all serious/potentially serious investigations must be lead by a senior manager)
- participate in safety visits/inspections/assurances of transport operations and follow-up on action items of assurance reports
- participate in the management review of the RTS Guideline

Since human behaviour is the major factor in road safety, creating a strong and positive culture will influence driver behaviour and safety performance.

First line supervisors are the vital link between management and driver, and they must exhibit strong leadership and commitment towards safety and be familiar with all aspects of road transportation safety.

Managers and supervisors should show a genuine interest in the welfare of drivers, the task they perform, and their achievements through recognition of skills, knowledge and rewards for good performance, including safety.

Development of a sense of pride and self-esteem of the drivers through regular communication and motivation will enhance the road safety performance.

A reward and recognition scheme should be put in place to reward good performance and promote a sense of pride and improve self-esteem of drivers.

The above points covering driver motivation can be summarised as:

- HGV driving should be recognised as a career
- drivers must be treated as professionals
- drivers need to be motivated to accept responsibility
- training is essential for skill development and motivation
- high standards of vehicles and vehicle maintenance will provide a healthy and safe working environment

## **2. GUIDING PRINCIPLES AND STRATEGIC OBJECTIVES**

### **2.1 GUIDING PRINCIPLES ON LAND TRANSPORTATION SAFETY**

In line with Group Policy on Health, Safety and Environment, PETRONAS is committed to strive for continual improvement in HSE performance of our land transportation operations.

This shall be achieved through:

- Provision of necessary resources and organisation
- Appropriate vehicle specifications in accordance with legal requirements, PETRONAS' standards and industry best practices
- Appropriate training and qualification programs
- Effective journey management
- Effective contingency plans to deal with any land transportation emergencies
- Regular communication with key stakeholders on matters related to land transportation safety

### **2.2. Strategic Objectives**

The Road Safety strategic objectives are a description of the safety performance the company wishes to achieve based upon the company business objectives, HSE policy and Land Transport Guiding Principles.

The strategic objectives will provide a basis for developing a hierarchy of objectives down to the driving activity by applying the Hazard and Effects Management Process described in Section 4. An example of a strategic objective is: "within a 5 year period, develop one of the best road safety records in the industry, moving from a risk level of "E5" to "C5" (see section 4.2), by reducing the risk of a fatal accident to as low as reasonably practicable, by minimising road exposure and improving safety management measures".

### **3. ORGANISATION, RESPONSIBILITIES, RESOURCES, STANDARDS AND DOCUMENTATION**

#### **3.1 Organisation**

The successful management of road transportation safety is a line responsibility and this needs to be reflected in the organisational structure and allocation of adequate resources. Line managers should be supported by competent Road Transportation Safety Advisors.

The OPU/JV should define, document and communicate, the roles, responsibilities and accountabilities of various parties including contractors in managing the road transportation activities through effective implementation of the RTS Guideline.

The organisation should include the HSE/Road Safety Committee and Emergency Management and response structure.

#### **3.2 Responsibilities and Resources**

##### **Management**

Management shall allocate adequate resources to ensure the effective implementation of the RTS Guideline. A senior manager with the required competencies shall be made responsible and accountable for the road transportation operation and HSE performance.

##### **Contractor**

Contractors are responsible for managing their road transportation businesses in a safe and responsible manner in compliance with local legislation while meeting the terms and conditions of the contract. They shall implement appropriate RTS Guideline in line with OPU/JV HSE MS. (see Section 5.1.)

##### **Road Transportation Safety Advisors**

The safety advisor shall advise the line management and facilitate the implementation of RTS Guideline and other matters relating to road transportation safety in accordance with local legislation.

##### **Driver**

Drivers who operate HGV vehicle transporting company products play an important role in successful implementation of RTS Guideline. The importance of complying with rules and regulations should be reinforced.

#### **3.3 Competencies**

The roles and responsibilities of individuals should be clearly defined in their respective job descriptions. The competencies of the road transport operations personnel shall be developed based on personal abilities and knowledge and skills of individuals.

The competency of all critical road transportation positions shall be developed based on the following process:

- define scope of position
- identify competences required for the job and prioritise requirements
- assess competences of current incumbents
- prepare a development action plan
- provide formal training, on the job training or self learning, as necessary
- review performance

A competency assurance system should be put in place for new recruit, current staff and contractors.

The competency of a driver should include the following:

- actual driving skills required for the type of vehicle being driven
- defensive driving skills
- knowledge and understanding of road safety legislation/rules
- emergency response (including fire fighting)
- general vehicle operations and maintenance of the vehicle
- vehicle inspection
- first aid
- product knowledge

### **3.4 Training**

Managers and supervisors shall be adequately trained for their respective jobs. In the specific area of road safety, managers and supervisors need to be fully conversant with:

- Local regulatory requirements
- all aspects of the RTS Guideline (including the implementation of the alcohol

and drugs policy)

- emergency response and crisis management
- the main causes of road accidents
- product or cargo knowledge
- assurances of road transport contractors
- safety inspections of vehicles and drivers
- scheduling and routing systems and journey management

**Training such as the following shall be conducted regularly:**

- Induction Training.
- Job Training.
- Defensive Driving Training.
- Product Knowledge Training
- Safety rules and Regulation
- Product Filling and discharging
- Basic First Aid
- Emergency Response
- Fatigue Management
- Behavioural Safety Training
- Mentor Driver Training

### **3.4.1 Driver Induction Training**

With a high percentage of accidents involving HGV drivers in the first twelve months of their employment in the OPU/JV, the importance of induction training after recruitment, supervision by mentor drivers, and continuous assessment needs to be stressed. For young and inexperienced drivers the risks are increased and special attention on selection and subsequent training is required. (see Section 5.2.1. for selection procedures).

All newly appointed drivers must attend a driving induction course before being allowed to drive. The induction course (and subsequent training) should be given by someone with HGV driving experience, competent in the subject matter and with good presentation skills. The course should be about three hours in duration, interspersed with suitable breaks, and should include the following topics:

- main component of the RTS Guideline
- local culture and attitude to driving
- local traffic regulations, road signs and markings
- government restrictions
- accident black spots
- the risks of driving and the common causes of accidents
- road accident prevention measures:
  - journey management (including maximum driving and duty hours, formal rest periods)
  - defensive driving
  - fatigue management
  - understanding on effect of medication, and influence of alcohol and drugs
  - vehicle design, specification, safety features and condition
- responsibility for care, cleanliness, inspection and maintenance of vehicles and associated equipment
- product or cargo knowledge (as appropriate)
- Personal Protective Equipment (PPE - as appropriate for products being handled and as identified by the HEMP e.g. Fire resistant or cotton coveralls; product resistant gloves; anti-slip, anti-static, safety shoes, safety helmet fitted with chin strap)
- emergency procedures through the use of Transport Emergency (TREM) cards:
  - product characteristics
  - vehicle breakdown
  - accident
  - first aid
  - fire fighting (including demonstration of fire extinguisher)
- accident reporting procedure

At the end of induction training each driver should be given a Drivers Handbook containing information and instructions which will help him to undertake his duties

safely and efficiently (see Appendix 2 for recommended contents list).

Contractor Drivers Handbooks should be approved by the OPU/JV & preferably be of a standard format.

### **3.4.2 Use of Mentor Drivers for Training and Coaching**

"Mentor Drivers" concept has proven to be effective in other companies. Experienced drivers acting as Mentor Drivers play a key role in the "quality control" aspects of the driving activity. They need to demonstrate above average driving skills and be capable of working effectively in a coaching and mentoring role, as well as evaluating new recruits and carrying out periodic reviews of existing fleet drivers and their vehicles.

Mentor Drivers should be used to assess and coach new applicants in the first three "probationary" months (see Selection and Recruitment, Section 5.2.1). They will also carry out refresher training and monitor on a regular basis the driving standards of all the drivers in the fleet.

### **3.4.3 OPU/JV Specific Training**

As soon as practicable and within three months of being appointed as a driver, he should attend a comprehensive driver training course. The course could be organised in separate modules or integrated into one course of three to five days duration. The main elements of the course are as follows:

#### **OPU/JV**

- OPU/JV HSE policy
- RTS Guideline overview
- road safety objectives

#### **Legal**

- Local legislation
- Local highway code

#### **Risk Awareness**

- accident statistics (company/national) and main causes of accidents
- local culture/attitude towards driving
- accident black spots

- use of seat belts
- fatigue management
- alcohol and drugs policy
- effect of medication
- action in case of a breakdown (dangers of staying next to/working on a vehicle next to a busy highway; use a reflector vest and warning triangle)

### **Driving Skills**

- defensive driving

### **Technical Knowledge**

- product or cargo knowledge
- the "fire triangle"; causes of ignition; types of fire extinguisher; fire-fighting techniques, including the use of a fire extinguisher on a live hydrocarbon fire
- emergency response procedures
- basic first aid
- vehicle operation and daily vehicle inspection programmes
- vehicle stability
- vehicle safety features

### **Reporting**

- vehicle fault reporting and repair procedures
- incident reporting

A training record shall be maintained for each driver.

#### **3.4.4 Defensive Driving**

Safe drivers always exhibit the ability to maintain required levels of concentration, and to anticipate, assess and respond appropriately to potential hazards continuously over long periods. By exercising these skills Defensive Drivers maintain a space and time zone around the vehicle thus preventing the development of dangerous situations. Use of these techniques has been shown to reduce accident rates substantially.

The objective of defensive driving is to:

- improve awareness on road safety
- sharpen the skills of observation, perceptions and anticipation
- provide skill for the driver to correctly assess and respond to a situation

The Defensive Driver continually makes allowances for:

- handling characteristics of the vehicle
- a lack of skill and knowledge or unpredictable actions on the part of other drivers, vulnerability and unpredictable behaviour of pedestrians and cyclists
- unpredictable behaviour of animals
- hazardous climatic conditions
- hazardous road features, e.g. curves, hills, narrow roads, bridges, absence of signs or signals and obstructions

By exercising the above skills, defensive drivers maintain a safety zone around the vehicle. Defensive driving training should be carried out by a driving specialist and should include classroom training followed by an assessment on the road, the results of which should be recorded in the drivers' personal training record.

#### **3.4.5 Refresher Training**

Following the initial driving courses outlined in earlier sections, refresher training for defensive driving training should be provided after every two years, the actual frequency shall be determined by OPU/JV. The training can be conducted in various format including modularised, and should cover the key road safety issues in the context of the local driving standards and conditions. One of the main challenges will be to retain the interest of the driver, so simple repeats of the first course should be avoided. A workshop style format is an alternative approach, where drivers can become directly involved in the discussion on road safety issues.

Competence profiling exercises may reveal specific training requirements, which will need to be addressed. Similarly, if specific weaknesses in a driver's performance have been identified (e.g. following an incident or by monitoring the driving characteristics recorded on the Tachograph) then similar action will be required. This could take the form of counselling, coaching (e.g. use of mentor drivers), a workshop, discussion in a driver meeting or attendance at a specific course.

### **3.5 Communication**

Effective communication on all aspects of road safety is essential within the OPU/JV and road transport contractors, as well as other key external players, namely:

- governments and authorities
- customers
- the affected general public
- other oil companies
- vehicle, equipment and tyre manufacturers/suppliers

It is important to engage and assist the relevant Government department such as the Road Safety Department in developing national road safety programmes to:

- improve the awareness and driving skills of the public
- provide well designed/maintained highways
- establish effective law enforcement

In developing countries this will be a challenging and long term exercise but essential if Group road safety objectives are to be attained. For example, OPU/JV could participate in road safety awareness campaigns and relevant projects, which will promote goodwill with the Government agencies.

Involvement with Government initiatives should be undertaken in collaboration with relevant industry bodies. Industrial road safety community should be established as this will provide the most effective platform to raise road transport contractors' standard and performance.

The role and responsibilities of senior managers, transport managers, road transport safety advisor, HSE advisors and Public Affairs (PA) personnel in road safety management shall be clearly described in their respective job descriptions.

### **3.5.1 Communication Systems**

Various forms of communication on road safety can be used in OPU/JV and is listed below:

#### **Written Communication**

- guiding principles on road transportation safety
- papers on road safety and awareness pamphlets
- written speeches of senior management

- minutes of meetings
- newsletters and safety bulletins
- weekly/monthly/quarterly road safety reports
- road safety suggestion schemes
- statistical performance data
- assurance and inspection reports
- road accident investigation reports
- progress reports against road safety action plans
- road safety guidelines

### **Meetings**

- meeting with government agencies
- HSE Committee
- Road Transport Safety Committee meetings
- OPU/JV – road transport contractor meetings
- driver safety meetings
- peer group meetings
- "tool box" meetings
- industry committee meetings
- dialogue session with key stakeholders

### **Promotional Aid / Materials**

- road safety posters
- safety performance boards (e.g. showing accident free days, safe kilometre driven etc.)
- driver notice boards showing e.g.:
  - accident black spots, accident information (root causes analysis/photographs),
  - safety infringements, best driver of the month, safety tips etc.

## **Multimedia**

- TV and radio based road safety awareness campaigns for general public
- video based "leadership and commitment" message from the Chief Executive Officer/Senior Management on road safety
- training and awareness videos on road safety
- cassette tapes, CDs, DVD , MP3 containing a mixture of music, OPU/JV information and safety messages for HGV drivers

### **3.5.2 Communications in an emergency**

Effective communication among various parties is critical in the event of an emergency. OPU/JV shall set up an effective communication system with appropriate authorities and other relevant external parties.

The communication systems set up in Emergency Management Centre shall include but not limited to Fax, E-mail, hands-free telephones, portable/mobile telephones, recording machines, PCs, camcorder and TV/video recorder. In some cases, video conferencing may prove useful (if available).

### **3.5.3 HSE Committee/Road Safety Committee**

In OPU/JV a main HSE Committee shall be formed under the chairmanship of the most senior executive. A hierarchy of HSE Committees may be necessary, depending on the size of the OPU/JV and range of business activities. OPU/JV with large fleets of vehicles, especially operating in challenging environments, should form a Road Safety Committee.

The chairman should be a member of the main HSE Committee and have line responsibility for road transport operations. The core members of the road safety committee should include amongst others the road transport manager, road transport safety advisor and Public relation officer.

In small OPU/JV, the activities of the Road Safety Committee could be incorporated into the OPU/JV main HSE Committee. In all cases a "cascade" system must operate so that an appropriate member of the committee attends and preferably chairs the associated sub committee or worksite meeting, thereby ensuring effective (two way) communication throughout the OPU/JV.

The main HSE Committee should meet at least quarterly, and the frequency of meeting for the road safety committee should be decided by OPU/JV. The main function of the Road Safety Committee is to review the following:

- all elements of the RTS Guideline (undertaking a comprehensive review at least once per year)
- the implementation of the road transport HSE plan
- road safety performance data
- road incident reports
- road safety suggestions from the work force
- road safety promotion
- road safety issues from Industry Committees and Government bodies
- new legislation on road transportation
- road transport contractor audit programme and reports/vehicle inspections and follow-up action plan
- relevant minutes and action items arising out of road safety committees and meetings

Concise minutes of the above committees, with action items (responsible party, tasks and targets) should be issued within a specified time.

#### **3.5.4 Driver Safety Meetings**

Regular meetings amongst drivers should be held to discuss road safety concern and issues. In OPU/JV with a high road accident rate, drivers should attend at least one meeting per month, which may cover:

- matters arising from other meetings/committees
- specific safety concerns of management/awareness programmes
- driver safety concerns/initiatives
- current road safety performance
- driver good performance awards
- tachograph infringements
- unsafe situations and conditions at customers premises
- specific hazardous situations on the road/accident black spots
- safety issues associated with the vehicles
- safety promotional activities
- results of any road accident analysis reports

- new legislation on road transportation

Minutes of driver safety meetings should be issued to all attendees and relevant department within specified time frame.

### **Peer Group Meetings**

In peer group meetings, drivers discuss the causes of accidents, including poor driving habits, based on their own experience. A key feature of this approach is that each driver has to make a personal decision to improve a certain aspect of his behaviour. A possible approach would be for:

- drivers to meet for about 1 hr in groups of about 10 to discuss and identify safety problems/concern in their work
- the groups meet a second time, also for about 1 hr, to identify problems/concern that they can resolve by themselves and handover the other problems/concern to OPU/JV management
- in a third meeting which also lasts for about 1 hr, the groups will deliberate on solution to the problems that they themselves could resolve

The peer group meeting encourage an exchange of information among drivers on road safety.

### **3.5.5 Tool box Meetings**

Safety "tool box" meetings, lasting between 5 to 10 minutes, offer a very effective mode of communication between supervisors and drivers. Tool box meeting shall be held daily and cover a specific safety subject/topic, relating where appropriate to conditions prevailing on the day (e.g. poor visibility). Tool box meetings can be supported by a weekly one page "safety news" covering a particular subject or concern.

### **3.5.6 Road Safety Promotion**

The effective promotion of road safety in the OPU/JV is essential if positive attitudes are to be fostered. Promotional campaigns and materials may include some of the following:

- road safety posters displayed in drivers mess rooms. (posters need to be changed regularly if they are to have an impact)
- safe driving award presentations
- road safety driving competitions

- road safety quiz competitions
- road safety days
- safety notice boards showing accident free driving kilometers
- driver of the year
- road transport contractor of the month/year
- warning notices of road works and accident black spots
- safety theme of the week/month
- healthy life styles (smoking, diet, exercise, stress)

### 3.6 Standards

Various Group publications on standards related to road transportation are listed in Appendix 1 Road Transport Guidelines And Publications. In the RTS Guideline documentation specific reference to these standards is required.

The standards required for vehicles should be recorded with reference made to national or international regulations and subdivided into two categories:

- new vehicle specification
- minimum standards for existing vehicles

All vehicles should have a recognised international type approval (see Appendix 4). All vehicles must be maintained in full working order according to manufacturers' recommendations and kept in a clean and tidy condition.

Tyres are an important safety feature, requiring careful selection and maintenance should be guided by manufacturers' recommendations. Tyres must be free of cuts, bald patches and other defects. They need to be maintained at the correct operating pressure and must have a minimum tread depth of 3 mm for the front axle and 2 mm for the rear axle(s).

Certain types of tyres are suitable for re-cutting, provided this is undertaken by a competent tyre specialist and that such tyres are not fitted to front steer axles of HGVs.

Re-capping tyres using the "cold cure" method is acceptable provided they are only fitted to **non-steer axles**. Care must be employed, however, to ensure that only perfectly sound casings are used for re-capping, which have an existing tread depth of at least 2 mm. A rubber compound of required quality must be used for the new tread.

**Tyres should not be re-capped using the high temperature vulcanising process.**  
The required safety features and standards for tyres need to be clearly defined in the contract of road transportation (see Appendix 6.)

### **3.6.1 Legislation**

Applicable laws and regulations governing the company's road transport activities need to be identified, understood and suitably documented within the RTS Guideline.

### **3.7 Documentation**

The RTS Guideline need to be documented and form part of the OPU/JV HSE Management System. The RTS Guideline should be a controlled document as per OPU/JV document control procedure, e.g. conforming to the requirements of ISO 9000 or similar Quality Assurance accreditation programmes.

The recommended RTS Guideline document structure is outlined in the following sub-section.

#### **3.7.1 RTS Guideline Documentation Structure**

##### **Part 1: Introduction.**

Provides introduction to the document and management's endorsements of the RTS Guideline.

##### **Part 2: Road Transport Operations.**

Provides sufficient background information on road transport operation including hazard management process and road transport safety management. It could include the following:

- goods and products handled
- customer profiles by type and number
- number of vehicles operated, in total and by the company and by each contractor
- numbers of regional centres of operation (e.g. depots)
- longest trip (one way in km), average trip, total km travelled
- vehicle type, age and size (suitably categorised)
- number and age profile of drivers
- shift pattern, days worked per week, % vehicle utilization

- descriptions of the road environment
- safety performance indicator over the last three years (Total Vehicle Accident Rate, Serious Vehicle Accident Rate and Fatal Vehicle Accident Rate)
- summary of principle challenges

This information should be updated annually or following a significant change.

### **Part 3: Element of the RTS Guideline**

Describes the details within each element of the RTS Guideline:

- 3.1 Leadership and Commitment;
- 3.2 Guiding Principles and Strategic Objectives;
- 3.3 Organisation, Responsibilities, Resources and Documentation;
- 3.4 Hazard and Effects Management;
- 3.5 Planning and Procedures;
- 3.6 Implementation and Monitoring;
- 3.7 Assurance;
- 3.8 Management Review.

### **Part 4: Activities Catalogue**

The RTS Guideline is restricted to the management of road transport vehicle on the road while, other activities such as loading and discharging of products are covered in other documentation. For example, for bulk road tanker operations, loading would be covered in the Depot HSE Case. However this should be based on lines of responsibility for the various activities and therefore some OPU/JV may choose to include these activities in their RTS Guideline.

The breakdown of road transport operations into activities is a critical part of the process. It is possible to break down every activity into its constituent tasks but this would be a major undertaking. It is more important to break down the activities to a realistic level, but it must be ensured that all hazard management issues for that activity can easily be identified at that level.

The activities for the RTS Guideline could be defined at the high level, such as:

- contractor management
- driver management
- journey management
- vehicle management
- industry liaison

- government liaison

Activities can be adequately handled at this level but each activity would need to be covered in great detail to ensure that all possible factors had been considered. Breakdown to a lower level would involve more work but the additional rigour is likely to ensure that nothing is overlooked. Such breakdown also gets the activities to a level where accountability can be more realistically placed with one individual, rather than more at department level. For example "journey management" could be broken down to:

- established designated routes including agreed stopover points and contact points
- establishing standard trip times
- Mapping of route hazards such as high population areas, black spot etc.
- preparing journey plans
- undertaking the journey
- controlling speed and driving hours
- monitoring journey performance

It is essential to ensure that within each activity all relevant tasks are covered. As an example "undertaking the journey" should include not only driving, but also, for instance, parking during the journey and roadside repairs.

For each activity the following areas will need to be documented:

- a description of the activity
- the hazard management objectives
- methods to achieve the objectives
- information recording and verification
- reference documents (e.g. Group, and OPU/JV guides and ISO 9000 Manuals)
- accountable party
- note of deficiencies
- performance indicators
- hazard register cross-reference

## **Part 5: Hazard and Effects Analysis (and Hazard and Effects Register)**

Provides a demonstration that all potentially significant hazards and effects have been identified, the risks from the hazards evaluated and the controls to manage the causes (threats) and consequences of the hazards are in place. The elements required to be described in detail in the hazard and effects register are therefore:

- identification and description of all hazard and possible hazardous events
- assessment of risks arising from the hazards, including identification of all possible threats, consequences and escalation factors, and estimation of potential based on the Risk Matrix (see Fig.3. in Section 4.2.2)
- controls required for each threat to reduce the risk, and identification of any controls not in place to be included in the Remedial Work Plan
- recovery methods and facilities required to mitigate consequences, and identification of any recovery measures not in place to be included in the Remedial Work Plan

## **Part 6: Identified Deficiencies and Remedial Work plan**

This section lists the deficiencies identified in the Hazard and Effect Management Process. It then describes the prioritised plan for dealing with the identified shortfalls with action parties identified and completion dates agreed.

## **Part 7: Conclusion and Statement of Fitness**

Following legal and functional advice a further section "Conclusion and Statement of Fitness", could be included.

### **3.7.2 Document Control**

The RTS Guideline is a "live" document and the principles for management control of documents are:

- identification of requirements by Business Unit, division, or activity
- approval by the Transport Manager (custodian) prior to issue
- review on an annual basis with revisions as required
- change and issue in response to a specific need
- availability of current version at all locations where issued
- definition and understanding of document change and modification procedures
- removal of obsolete document promptly from all points of issue

The appointed custodian is responsible for the approval of standards, procedures and technical content.

Line management is responsible for the implementation procedures contained in the documentation, monitoring compliance and advising document custodians of any inaccuracies or obsolete information and obtaining custodian approval for (and documenting) any deviations.

#### 4. **HAZARDS AND EFFECTS MANAGEMENT PROCESS (HEMP)**

The guidelines are generic in nature and may not cover some OPU/JV specific safety management issues. It is important therefore that each OPU/JV undertakes a HEMP exercise focussed on their own transport activities.

As part of the HEMP the OPU/JV should set its own hazard management objectives and define the level of hazard control and appropriate recovery. Any gaps, identified by the HEMP, between OPU/JV criteria and the actual level of hazard management being achieved, will lead to the production of a deficiency list and subsequently a related, remedial action plan. For each hazard, the analysis should be documented (see Section 3.7) and the findings communicated to OPU/JV and contractor employees.

Identifying and managing hazards and the adverse effects of road transportation operations is an essential part of road safety management. The basic steps in hazards and effects management process are:

**Identify** hazards, hazardous events and threats (i.e. what could go wrong).

**Assess** how serious an accident could be and the probabilities of it happening.

**Control** the situation as far as practical by identifying ways to eliminate or minimise the likelihood of an accident occurring.

**Recover** from an accident situation by limiting the consequences and having well understood and rehearsed emergency response plans and recovery equipment available.

In all cases the HEMP must lead to the reduction of risk to a level that is As Low As Reasonably Practicable (ALARP). Definitions related to this process are provided in the glossary.

##### 4.1 **Identifying Hazards and Hazardous Events**

Hazard and Effects identification is based on knowledge, experience and judgement of staff and contractors, including drivers. In the case of driving an HGV, examples of hazards include:

- the kinetic energy of the vehicle
- the product being carried (e.g. flammable, corrosive, explosive substance , etc)
- the kinetic/potential energy of a cargo on a trailer/cab
- the cargo or product carried by a third party vehicle
- overhead high voltage cables

- falling rocks
- flooded road
- robbery/hijack
- working on top of trailer
- asphyxiating atmosphere within the tank of a trailer, empty or partly empty of product.

Examples of hazardous events include:

- high-speed head-on collision with another vehicle
- vehicle/pedestrian impact
- vehicle roll-over
- ignition of escaped flammable liquids from a road tanker following a collision
- spill of toxic product
- shedding of the vehicle's load

## **4.2 Assessing the Risks**

It is important to identify all causes, or "threats", that could trigger the release of a hazard and turn it into a hazardous event or incident, the likelihood or probability of that release occurring, and the possible consequences that could result. The combination of probability and consequence allows an assessment of the risk to be made.

### **4.2.1 Identifying Threats**

There are many "threats" that could trigger a road transport incident and for which suitable controls will need to be selected. Examples of threats in road transport operations are:

- other vehicles
- consumption of alcohol and drugs or medication
- lack of sleep
- poor visibility
- poor maintenance - tyre failure, brake failure etc.

Threats associated with driving can be divided into three main areas, namely: the driver; the vehicle; and the environment. These areas are covered in more detail in the following sub-sections.

#### **(A) Threats - The Driver**

Accident statistics indicate that human behaviour is a primary cause of over 90% of road accidents. The threats relating to driver could be:

- untrained for type of vehicle he is required to drive
- unaware of the risks
- lack of defensive driving skills
- medically unfit e.g. poor vision, heart disease, epilepsy, obesity, musculo skeletal problems etc.
- under the influence of drugs, alcohol or medication
- suffering from stress
- impatient, aggressive, unstable (a risk taker)
- lacking in attention
- fatigued through lack of rest or climatic conditions
- lacking judgement/experience (generally associated with young and inexperienced drivers)

#### **Medication**

The following prescribed medication may have a profound effect on driving ability:

- sleeping tablets
- anti-depressants
- anti-anxiety tablets
- decongestants (cold remedies)
- anti-travel sickness tablets
- tablets for allergies such as hayfever

- . drugs for high blood pressure, epilepsy and diabetes
- eye drops (containing mydriatics or miotics) which can produce severely blurred vision)

Patients should not drive within 48 hours of a general anaesthetic or being given strong sedatives for minor out-patient surgery. Alcohol consumption will make it worse.

Major mistakes made on the road mainly include misjudgements: either of the consequences of one's own actions or of the behaviour of others. Some common major mistakes are listed below:

- failure to notice pedestrians and cyclists on the road
- misjudgement of the speed of oncoming vehicles in an overtaking manoeuvre
- failure to look at the mirror prior to a manoeuvre
- failure to see "stop" or "give way" signs
- sudden braking of the vehicle
- unaware of potentially dangerous road conditions including road block until too late
- inadequate attention to the vehicle ahead and oncoming

Violation is not acceptable as it is an act of deliberate deviations from known traffic regulations, accepted codes of behaviour and safe driving procedures.

The important distinction between mistakes and violations relates to the ***driver's intentions***.

## **(B) Threats - The Vehicle**

Although ***less than 5 per cent*** of road accidents are directly attributed to vehicle defects, a properly designed, equipped and well maintained vehicle, is an essential requirement.

Threats associated with vehicles include:

- inadequate vehicle selection criteria and procedures
- poor design/inadequate specification

- lack of specific safety features (e.g. side and rear guard protection)
- inadequate maintenance (e.g. defective or worn tyres)
- overloading or inappropriate weight distribution
- poor house keeping

### **(C) Threats - External Environment**

This is a challenging area requiring serious attention with few short term solutions. However, it is possible to manage the specific hazards of regular routes through direct involvement of drivers in the hazard management process. In some cases it may prove necessary to eliminate the use of certain high risk roads.

Threats from the external environment can be categorised under three headings: society; infrastructure; climate and the natural environment. These issues are covered in greater detail in the following sub-sections:

#### **Society**

- rapid increase in the number of vehicle on the road in developing countries
- lack of safety awareness in the society especially pedestrians, cyclists
- untrained drivers of other vehicles
- inadequate road safety legislation
- inadequate law enforcement
- sabotage or hijack

#### **Infrastructure**

- ☐ poor design of roads and related infrastructure, including road layout, contours, road surface, road markings, lighting, road signs, barriers, vehicle lane segregation, hard shoulder and safe stopping/rest areas
- ☐ hazardous road conditions such as deep potholes, steep hills, narrow bridges, sharp bends, multiple road junctions and steep drops.
- ☐ floods, landslides, falling rocks, sink holes, trees and illegal parking adjacent to the road
- ☐ lack of effective traffic control
- ☐ inadequate maintenance of roads (poor surface condition, potholes)

- ☐ little or no segregation of vehicles from pedestrians/live stock/wild animals  
e.g. fencing
- ☐ temporary obstructions such as parked vehicles, road works, road blocks etc.

#### **Climate and Natural Environment**

- ☐ nature of terrain (e.g. mountains, deserts, swamps)
- ☐ heat, humidity and glare
- ☐ dust
- ☐ rain, snow, ice
- ☐ fog/mist/haze - visibility
- ☐ hours of daylight - visibility
- ☐ insects
- ☐ wild animals
- ☐ pollen

#### **4.2.2 Risk Assessment**

The level of risk associated with each of the identified hazards can be quantified after the probability or likelihood is determined and the possible consequences are assessed.

The probability and consequences are best evaluated by an in-depth review and sound analysis of all serious and potentially serious incidents within the OPU/JV over the last three to five years. This should be complemented by a sound understanding of industry and national (if available) data relating to road accidents.

The PETRONAS "Risk Matrix", modified for road transport operations as shown in Figure 3, can then be used to plot the risk for each hazard. The assessed risk can be regarded as either intolerable, negligible or in a region between the two. In all cases measures need to be introduced to reduce the risk to a level "As Low As Reasonably Practicable" (ALARP), reflecting local conditions, cost benefit considerations, available technical solutions and viable options.

#### **Figure 3 Hazard Assessment Matrix (Road transport Operations)**

## **Hazard Assessment Matrix (RTO)**

| Consequence |                   |                |                  |                      | Increasing Probability                           |                                          |                                            |                                               |                                                             |
|-------------|-------------------|----------------|------------------|----------------------|--------------------------------------------------|------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
|             |                   |                |                  |                      | Very low                                         |                                          |                                            |                                               | Very high                                                   |
| Rating      | People            | Env'ment       | Assets           | Reputation           | A                                                | B                                        | C                                          | D                                             | E                                                           |
|             |                   |                |                  |                      | Has not occurred in industry in the last 5 years | Occurred in industry in the last 5 years | Occurred in the OPU/JV in the last 3 years | Occurred once in the last 12 months in OPU/JV | Occurred more than once in the OPU/JV in the last 12 months |
| 0           | No injury         | Zero Effect    | Zero damage      | No Impact            |                                                  |                                          |                                            |                                               |                                                             |
| 1           | Slight injury     | Slight Effect  | Slight damage    | Slight Impact        |                                                  |                                          |                                            |                                               |                                                             |
| 2           | Minor injury      | Minor Effect   | Minor damage     | Limited Impact       |                                                  |                                          |                                            |                                               |                                                             |
| 3           | Major injury      | Local Effect   | Local damage     | Considerable Impact  |                                                  |                                          |                                            |                                               |                                                             |
| 4           | Single fatality   | Major Effect   | Major damage     | National Impact      |                                                  |                                          |                                            |                                               |                                                             |
| 5           | Multiple fatality | Massive Effect | Extensive damage | International Impact |                                                  |                                          |                                            |                                               |                                                             |

Assessment of risk for each hazard will vary from country to country, but some examples of the hazards identified in Section 4.1 are given below:

- ☐ . kinetic energy of the vehicle C4
- ☐ . kinetic energy of third party vehicle C4
- ☐ . product being carried (gasoline) B5
- ☐ . low level high voltage cables A4
- ☐ . asphyxiating atmosphere within the tank of a trailer D4

In addition to the use of the Risk Matrix for assessment of risk associated with each hazard, each OPU/JV can use the matrix to plot actual performance and set targets/objectives for future performance.

### **4.2.3 Contractor Risk Appraisal**

All contractors should be assessed either using the guidelines set out in "Risk Management Appraisal of Road transport Contractors" (see Appendix 1) or an equivalent assurance appraisal system.

### **4.3 Controls to Reduce Risk**

Where unacceptable conditions exist, specific measures aimed at reducing risk need

to be developed and implemented. Risk reduction options should include both preventive and recovery measures. Examples:

- use of seat belts (recovery)
- vehicle safety features such as side guards and rollover protection (recovery)
- journey management (preventive)

#### **4.3.1 Reduction of exposure to road accident**

In view of the high risks involved, exposure to road accident should be reduced to the minimum.

- ☐ operating 24 hours as a means of transferring workload to those time periods when there are not so many third parties, including pedestrians on the roads (generally, this will increase the risk to the driver owing to shift-fatigue problems and reduced visibility, but should reduce the risk to third parties - this will need to be assessed based on local conditions/circumstances)
- ☐ smoothing out distribution activities by effective logistics planning and arrangements with customers
- ☐ avoiding when practicable, peak traffic times such as "rush hour" and travelling on the road during peak holiday traffic conditions

#### **4.3.2 Operational Risk Reduction Measures**

Risk reduction measures need to be implemented which will cover the following key areas:

- ☐ competency of OPU/JV staff
- ☐ the use of only approved road transport contractors
- ☐ effective driver management
- ☐ effective journey management
- ☐ effective vehicle management (including specification and maintenance)

These subjects are covered in more detail in Section 3 (Competencies and Training) and Section 5 (Procedures).

#### **4.4 Recovery Measures**

In the event of a road accident the objective is to mitigate and minimise the consequences of the event through established emergency response plan which includes:

- ☐ emergency notification and call-out systems
- ☐ competent, fully equipped and suitably located, emergency response teams
- ☐ clearly defined arrangements with local authorities and emergency services
- ☐ medical emergency plan to deal with casualties of road accidents
- ☐ clear instructions to drivers backed by training on how to deal with road emergencies
- ☐ providing all drivers with basic first aid training and refresher training periodically
- ☐ provision of first aid kits, fire extinguishers and suitable communications system on the vehicle

Emergency response procedures are covered in more detail in Section 5.