

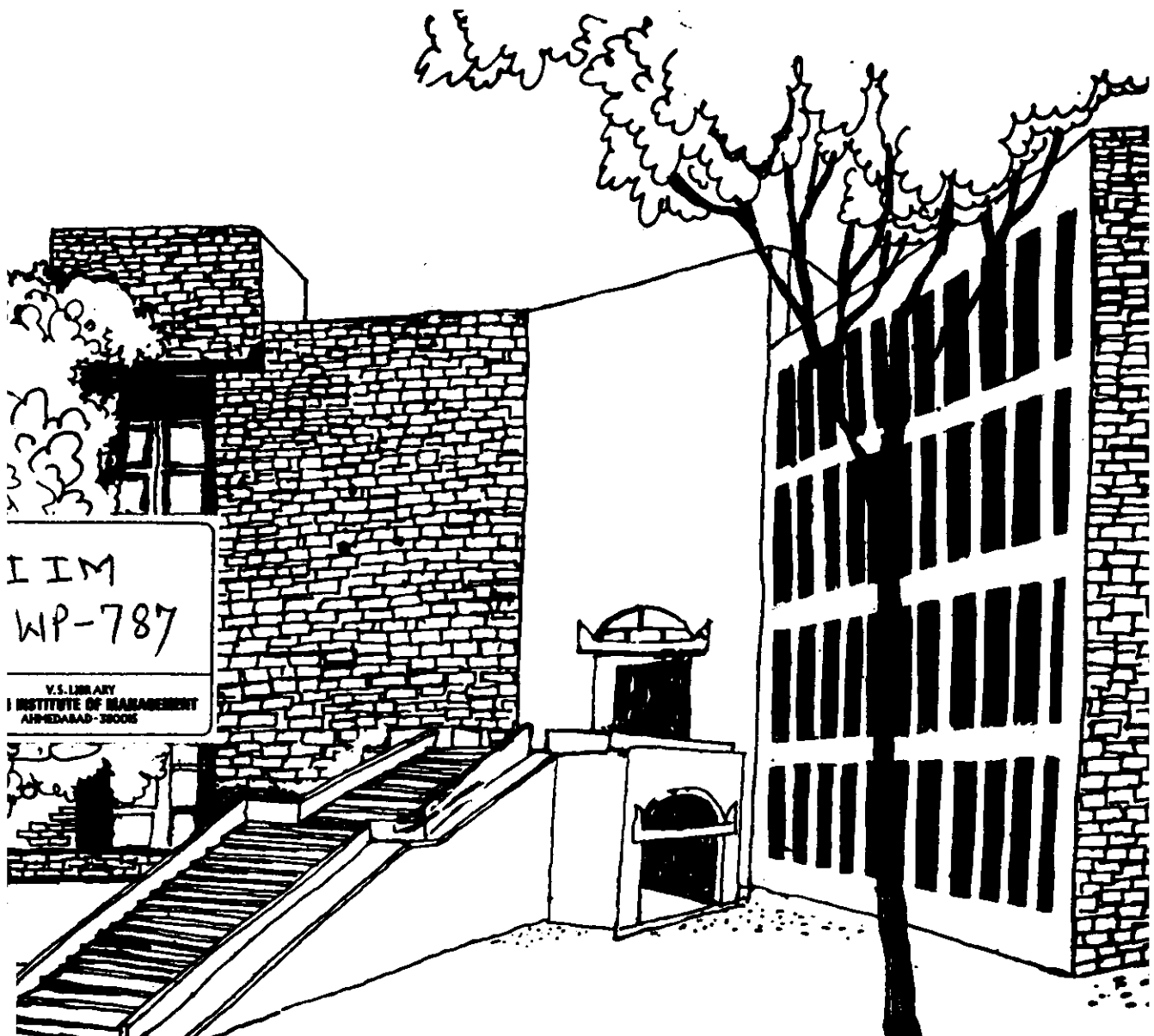


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Working Paper



ACCIDENT RATES AND SAFETY PRACTICES
IN ROAD TRANSPORT CORPORATIONS

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CORPORATIONS

Alarming rates of road accident have become a major concern all over the world. An estimate by World Health Organization shows that around 2.5 lakh deaths and a crore of injuries are caused by road accidents every year. The major reason is the ever increasing vehicle population which floods roads without a subsequent increase in the transport infrastructure. Moreover, the mix of vehicles on the road is so diverse that every vehicle has to interact with a variety of other vehicles at the same time.

The problem of accidents is much more acute in developing countries where accidents are relatively higher. 2,08,000 accidents took place on Indian roads in 1985 in which 39,000 persons were killed and 1,68,000 were injured. The vehicles of the State Road Transport Undertakings (SRTUs) are involved in a substantial part of these. Among these STUs themselves, there is large variation in accident rates which indicates that in addition to other factors, the attention paid to safety and accident control may differ. Looking at the high rate of accidents in certain Corporations it seems desirable to judge their performance not only in terms of profit and service, but also in terms of parameters such as accident rates, number of fatalities, etc.

*Alarming spurt in road accidents. Journal of Transport Management, January 1988, p.16 (Reproduced from the Times of India).

DEFINITIONS OF ACCIDENTS IN STUs

Most of the Road Transport Corporations (RTCs) in the country have adopted the definitions given by the Central Institute of Road Transport (CIRT) for classification of accidents. The following classification is laid down by CIRT:

- (1) Fatal accident is one involving loss of human life, immediately or within 30 days of its occurrence
- (2) Major accident is one involving grievous hurt to human beings and/or loss or damage to property exceeding Rs.3000/-
- (3) Minor accident is one involving simple bodily injuries to human beings and/or loss or damage to property exceeding Rs.300/- but not exceeding Rs.3000/-
- (4) All others not included in the above three categories are classified as insignificant.

BASIS OF STUDY

The present study attempts to understand and explain the variation in accident rates among various RTCs. In order to do so, five Corporations were selected to collect data on accidents and other related issues. Selection of RTUs was done on the basis of a comparative analysis of the accident rates* (minor, major, and fatal accidents) of all the State Road Transport Undertakings in India for the past three years. From the total list, five each

*Accidents per lakh Kms.

belonging to high, medium, and low accident category were identified. Finally two each were selected from high and low category, and one from the medium category on the basis of the frequency of occurrence of all types of accidents for the three years under consideration. Brief descriptions of the five corporations are given below.

CORPORATION 'A'

The Corporation was established in 1952, and its main area of operation is a state in southern India. It also operates a few trips in two other neighbouring states. In 1986-87 it had a fleet strength of 3019 buses (Exhibit II). The undertaking has had the highest accident rates among all the SRTUs in the country and in the year 1985-86 this rate was 2.2 accidents per lakh kilometres (Exhibit I). In the year 1986-87 alone the Corporation paid Rs.1.58 crores as accident compensation (Exhibit III). This means that it lost around Rs.6588 for every lakh kilometres it operated. Same figures for the years 1985-86, 1984-85, and 1983-84 were Rs.3109, Rs.2019, and Rs.1918 respectively, which show an increasing trend. While an increase in the number of accidents does increase the amount of compensation, another reason for this increase may be the fact that more and more victims have been approaching the Motor Vehicles Accidents Claims Tribunal (MACT) which was specially created by the government to expedite finalization of accident cases.

*This seems to be due to high compensation amounts awarded by the Tribunal compared to the ones settled within the Corporation.

On an average around 200-300 new MACT claims are filed against the Corporation every year in addition to around 500 similar cases which may already be pending (it takes around 8-9 months to settle a case). Apart from the compensation paid, it spends Rs.825 per case as legal expenses.

CORPORATION 'B'

Corporation 'B' was established in 1972 and its main area of operation is also a state in southern India and a few routes in two neighbouring states. Before nationalization, the Corporation was run by a well known private company. When the Corporation was formed the accident rate was as high as 1.76 per lakh kilometers. This has been gradually declining over the years and in 1986-87 it was 0.54 (Exhibit I). However it is still one of the five STUs in the country which have the highest accident rates.

The size of the Corporation is comparatively smaller. In 1986-87 it had a fleet strength of 739 buses (Exhibit II). Unlike Corporation 'A', 58.29 per cent of its operation is confined to city areas (Exhibit II), where the accident rates are usually higher than mofussil services. In the year 1986-87 the Corporation paid around Rs.75 lakhs (Exhibit III) as accident compensation which works out to Rs.9371 for every lakh kilometres operated.

On an average, 28 MACT cases are filed against the corporation every year, the legal expenses for which work out to between

Rs.700-800 per case. The average time taken to settle MACT cases is approximately one year.

CORPORATION 'C'

Corporation 'C' was founded in 1961 and its operational area consists of a state in western India and three other adjacent states. In 1986-87 the Corporation had a fleet strength of 7781 vehicles and only 4% of the total operation was in city areas (Exhibit II). There was a total of 1921 accidents in 1986-87 and the accident rate was 0.28 (Exhibit I). With this accident rate, this corporation is considered to be one with medium accident rate.

The Corporation paid almost Rs.1.5 crores as accident compensation in 1986-87 (Exhibit III) which works out to Rs.2165 for every lakh kms it operated during that year. The amounts for 1983-84, 1984-85, and 1985-86 were Rs.2407, Rs.4426, and Rs.4481 respectively. On an average the Corporation deals with 25-30 MACT claims in a month which cost around Rs.700-800 per case as legal expenses.

CORPORATION 'D'

The Corporation started its operation in 1932 with its area of operation mainly confined to a state in southern India. There has been a substantial increase in the size of its operations as the number of buses increased from 6072 in 1979-80 to 10760 in 1986-87. It had the highest number of buses among the five

corporations studied (Exhibit II). In recent years it has become one of the best RTUs in the country in terms of a few major parameters such as fleet utilization, number of vehicles held, vehicle utilization, EPKM, load factor, bus staff ratio, breakdowns, etc. In 1986-87, Corporation 'C' had 1873 accident at the rate of 0.2 accident per lakh kilometers (Exhibit I). This makes it one of the five SRTUs with the lowest accident rates in the country.

The Corporation spent almost Rs.1.1 crores as accident compensation in the year 1985-86 (Exhibit III) which works out to Rs.1296 for every lakh kms. During the same period, it dealt with 900 MACT case out of which 250 were finalized and 650 were pending.

CORPORATION 'E'

The main area of operation of Corporation 'E' is a state in eastern India. The size of operation is the smallest compared to the other four Corporations included in this study. In 1986-87 the total fleet strength was only 1553 (Exhibit II). The fleet utilization of Corporation 'E' is also the least among the SRTUs chosen for this study (Exhibit II).

The Corporation stands out as the STU having the lowest accident rate in the country. In 1986-87 the accident rate was 0.07 per lakh kms and the total number of accidents was 37. The total number of MACT cases in a year is between 6 and 10. There were 142 such cases pending settlement in 1988.

CAUSES FOR HIGH/LOW ACCIDENTS AND MEASURES TO REDUCE ACCIDENTS

An attempt was made to ascertain the causes for high or low accident rates in each of the five corporations studied. Attempts were also made to find out what steps had been taken by the corporations with low accident rates which may have led to the reduction in accident rates and also what steps could be taken by corporations with high rates of accidents to reduce them.

There are a number of factors which contribute the occurrence of accidents in state transport undertakings. However they can be classified into two broad categories:

- (a) accidents due to human error.
- (b) accidents due to mechanical failures.

Out of these two, most of the accidents are attributed to the former, while accidents attributed due to the latter are negligible and vary between 2-5 percent (or even less) in the five Corporations studied. Some of the important reasons identified in each of these Corporations are given below.

CORPORATION 'A' (HIGHEST ACCIDENT RATE)

CAUSES OF ACCIDENTS

(a) Overspeeding by drivers

Approximately 95% of accidents in Corporation 'A' were attributed to rash and negligent driving which is essentially human error. The Chief of Operations, an elderly man with several years of experience in the Corporation, substantiated the same by saying, "Most of the time vehicles involved are brand new ones and many a times

accidents occur on broad, good roads. Accidents on high ranges and tough routes are comparatively low". In the light of his long experience he interpreted this as the over-confidence on the part of drivers, and the tendency to speed up on a good road with a new vehicle. He cited a recent case where a Corporation bus was involved in an accident at a level crossing killing 8 people due to sheer negligence of the driver. The Chief of Vigilance and Security also shared the same view. He felt that any effort to control road accidents in the Corporation should basically be aimed at controlling error and negligence on the part of crew, especially drivers. He also felt that the management rarely gave any serious consideration to accidents which, according to him, was a basic factor for accidents continuing to remain high in the Corporation all the time.

(b) Settlement pattern and operating conditions.

Unlike many other states, the state in which the Corporation operates has a very peculiar scattered settlement pattern, mixed with cities and small towns all over, specially on either side of the roads. This combination of the settlement pattern with heavy rains and large number of bus stops all along, increases the chances of accidents. Though some of the accident prone areas are marked and signals displayed, drivers generally ignore these and meet with accidents.

(c) Bad road conditions, and poor visibility.

While road conditions are bad and visibility is poor all through the year, the situation gets worse during the rainy season which is almost 7 months in a year. The chances of an accident occurring thus increase further during the rains.

(d) Overloading

Over crowding in the Corporation buses, especially in the city areas during the peak hours of the day, was another reason for high accidents. Thus many times passengers standing on the foot-boards were hit by electric poles and other vehicles. There was no effective checking system to prevent overloading.

(e) Intoxication

The State is a wet area and liquor is available everywhere. Hence intoxication is an important contributory factor in accidents. There is no effective checking system in the corporation to detect this.

(f) Inadequate attention by top management

Though the Corporation had the highest accident rates among the STUs in the country, some of the officers felt that there was a lack of concern among the top management in terms of giving priority and this was a major obstacle in making any improvement in the situation. This was indicated by the fact that some of the concerned officers were not even aware that their Corporation is the worst in

terms of accidents. The Chief of Operations, responding to a question whether the Corporation had any safety policy, said that regular maintenance checking of vehicles and refresher courses given to the drivers were a part of that. However the syllabus of refresher course seemed to have hardly any emphasis on safety.

(g) Political interference

There was a lot of political interference in the Corporation's administration. This, especially at the stage of drivers' recruitment, often led to inappropriate persons being recruited. Some of the officials admitted that the coalition government in the state made it necessary to satisfy every MLA, by recruiting his candidate so that the ministry could survive.

(h) Union activities and lack of strict punishments.

Most of the higher level officers felt that there was extremely high indiscipline among staff due to strong union support on every issue. For this reason, imposing any discipline was very difficult. According to the Chief of Operations, introducing preventive measures and imposing punishments for accidents was extremely difficult in the Corporation because of interference and disruptions from the unions who had strong political backing from the state ministry.

(i) Lack of well designed training facilities.

Though the Corporation has had a training school for more than 30 years it lacked in facilities and the syllabus was not based on any feedback from research or analysis. According to the Principal of the Staff Training College, training programmes were identified on the sole basis of what profit would they bring to the Corporation (such as fuel efficiency training). The possibility of reducing the total expenditure due to accidents (including compensation) which was around Rs. 2 crores in the year 1987, through appropriate training programmes had not been considered.

(j) Fault of other drivers

Accidents attributed to fault of other vehicles constituted a very high percentage of the total accidents. The "other vehicles" which figured most frequently were two wheelers and light vehicles. This would call for more defensive driving practices. However none of programmes of the Corporation had any emphasis on this.

POSSIBLE MEASURES TO REDUCE ACCIDENTS

Given below are some of the possible steps that have been suggested at Corporation 'A' to ensure safety and control accidents:

(a) A comprehensive survey of roads needs to be undertaken and proper signs and directions need to be displayed. Moreover,

detailed information regarding certain accident prone areas has to be made available. However, the corporation has been unwilling to do the same because it operates only 30% of the total services in the state.

- (b) Well designed and decentralised (incorporating local conditions) training programmes emphasizing safety and handled by well qualified trainers, need to be introduced and persisted with.
- (c) Considerable improvement and better enforcement of traffic conditions in the city areas is needed.
- (d) A research oriented accident cell is required to be set up to give constant feedback to the corporation and the training school.
- (e) Better daily maintenance of vehicles, emphasizing on safety.
- (f) Regular and effective surprise checking system to prevent intoxicated driving.
- (g) To ensure that all these measures are successfully implemented, the corporation should have effectively greater autonomy to decide its own affairs.

CORPORATION 'B' (HIGH ACCIDENT RATE, WITH RAPID DECLINE)

CAUSES OF ACCIDENTS

- (a) Rash and negligent driving

As in Corporation A, most of the accidents in this Corporation were also attributed to negligent and rash

driving. "Lack of perception, proper judgment and anticipation on the part of drivers constitute the reason for more than 60% of accidents due to human error," remarked the Divisional Manager (Technical) who was in charge of dealing with accidents in the Corporation.

(b) Overcrowding

Around 80% of the Corporation's operations are in the city area, where the buses tend to be overcrowded. Travelling on the footboards and boarding running buses were very common. Hence a large number of accidents took place due to these reasons in the city areas. The Corporation was concentrating more on preventing these occurrences.

(c) Fault of other drivers

Accidents due to the fault of Corporation's drivers had been coming down over the years. An analysis of accidents done by the Accident Cell of the Corporation showed that in 1984-85 more than 50% of the accidents happened because of the fault of other drivers.

(d) Bad road conditions

Bad road conditions, improper traffic pattern, lack of indicators and sign boards etc., were often the factors responsible for accidents especially in the city areas. This suggests a need for much more coordination with local and highway authorities.

(e) Drivers' Psychology

Observation made by the accident cell for some years showed that in many cases, the drivers suffered from inferiority complex and felt unwanted. Thus they developed a sort of enmity towards others which results in careless driving. Moreover drivers who had family problems appeared to be involved in accidents more frequently.

(f) Mechanical failure

Though negligible, mechanical failures contributed around 1% of the total accidents. This was mainly in terms of front tyre puncture, breakage of front axle, etc.

CORPORATION 'C' (MEDIUM ACCIDENT RATE)

This Corporation has had a rapid decline in accident rates over the last few years. Given below are some of the major contributing factors for accidents as well as the reasons for the declining rate.

CAUSES OF ACCIDENTS

(a) Human error

As in the case of other SRTUs, by far the largest contributor to accidents was human error. In 1987, it accounted for almost 97% of the total accidents. Human error was generally due to the carelessness of the corporation drivers, drivers of other vehicles, or pedestrians. Accidents due to the fault of corporation drivers accounted for 46% of the accidents in 1987. Those

due to the fault of others were 51%. Some of the important factors contributing to the human error were as follows:

(i) Over speeding

Over speeding was a major reason for accidents in the corporation. Explaining this, a senior officer remarked "More than 50% of our drivers come from truck driving experience, where they are used to rash driving. It is very difficult to change this overnight. But due to the non-availability of sufficient candidates with passenger vehicle driving experience, we are compelled to recruit them". Similarly an analysis done by the accident cell showed that the drivers in the Corporation with an experience of 3-7 years, and those who were in the age group of 30 to 40 years were more likely to be involved in accidents. This seemed to decline sharply with increase in experience and age.

(ii) Intoxication

The state in which the Corporation operates is a dry area (selling of liquor is prohibited), so the problem of intoxicated driving is generally absent. However three divisions which have the highest accident rates, are close to other states where there is no prohibition. This is understood to be due to the prohibition. However proper checking facilities for intoxication do not exist.

(b) Bad road conditions

Bad road conditions in certain areas caused accidents, especially if the drivers were not careful. Moreover there were many places where proper sign boards and directions were not displayed to caution the drivers. This problem became acute during the monsoon and winter, when many accidents took place due to this reason compounded by poor visibility. The Corporation felt that there should be double lane roads on major highways.

(c) Lack of good training facilities

The Corporation did not have a training school of its own, and whatever training was given to drivers at divisional level was not well designed or very effective. The officers felt that there should be a well designed, decentralized training programme for drivers, and also an institute to train the instructors.

(d) Accidents due to the fault of others

In this category accidents due to fault of truck drivers were the highest (32% in 1987). This was followed by two wheelers and light motor vehicles which amounted to 26% for the same period. This showed the need for defensive driving by the Corporation's drivers.

STEPS TAKEN TO REDUCE ACCIDENT RATE

On exploring the reasons for the declining rate of accidents, the following factors seemed to stand out:

(a) Accident Prevention Drive

In order to bring down the high accident rates then prevailing, the Corporation undertook a massive accident prevention drive in 1970's. This included campaigns such as frequent issuing of circulars and appeals to the Depot and Divisional Managers as well as drivers, displaying of posters about safe driving and disasters of accidents, conducting training programmes, showing video films of accidents to drivers, etc. "We used to change our posters almost every 10 days, and the drive really worked", said a previous Managing Director who had more than 30 years experience with the Corporation. These efforts seemed to have really brought down the accident rate from as much as 0.50 to 0.28 accidents per lakh kilometres. Some of the steps taken by the Corporation during the drive are given in Exhibit IV.

(b) Formation of accident cell

As a part of the drive against accidents, an accident cell was formed at the Central office. This cell collects information about all accidents and gives feedback to the top management for corrective action. The cell was established in 1967, and it was exactly in that year that the accident rates started falling.

(c) Fuel efficiency drive

Almost at the same time the Corporation undertook a fuel efficiency drive and the kilometres per litre of diesel also

improved very fast. (The Corporation got the Petroleum Conservation Research Association (PCRA) award twice). This greatly helped in reducing the accidents indirectly because the fuel efficient driving necessitates a constant speed of 40 to 50 KMPH.

(d) Speed control measures

Speed control measures were strictly implemented and most of the Corporation buses were provided speed control devices which prevent the speed from going above 60 kmph.

(e) Fixation of bus and route

The Corporation was following the policy of fixation of a particular route and bus for a particular driver (unlike some other corporations where a single bus and route is handled by many drivers). "This created a sort of attachment of the driver with the vehicle, due to which he handled it carefully", said a senior officer of the Corporation who was incharge of research. This is understood to be another reason for the declining accident rate.

(f) Coordination with highways department

Certain accident prone areas were identified by the Corporation and were informed to the local authorities or highways department to take necessary steps such as widening of roads, display of signals, etc. This practice has since been continued.

(g) Top management involvement

One important aspect which emerged out of the discussions with the Corporation officials regarding accidents, was that the main reason for the success of accident reduction drive was a lot of willingness and initiative from the top management who personally involved themselves in these matters to give the necessary direction and initiate action.

CORPORATION 'D' (LOW ACCIDENT RATE)

Given below are some of the major factors considered to be responsible for the low rate of accidents in Corporation 'D'.

(a) Priority given by top management

As in the case of the Corporation 'C', priority given and initiative shown by top management towards safety and accident reduction seemed to be the main driving force in keeping the accident rate low in Corporation 'D'. The Managing Director used to undertake a monthly review of the key performance indicators of the Corporation (this was made easy by computerization) and used to issue circulars to the depots which had high accident rates, asking for an explanation and demanding action. Exhibit V shows one such analysis of accidents and Exhibit V a is one of the circulars issued by the MD. Constant personal involvement of the MD in the performance of depots kept their attention on safety. Measures such as sending drivers for training, giving warnings, ensuring good mechanical condition of vehicles, etc. were also taken regularly. Since the depot manager was completely empowered with the operation of the depot, his instructions were obeyed by the crew.

(b) A reasonably well designed, decentralized training programme. Out of the 5 Corporations selected for study, only Corporation 'D' had a decentralized training programme. Moreover the contents of the accident training were based on feedback given by the accident cell and were found to be frequently modified to suit current needs. Decentralized training centres made it convenient for the drivers to attend without being away from their homes and also without losing financially. In fact, this was also one of the suggestions made by a very senior driver in one of the other corporations studied, to increase participation in and effectiveness of the programme.

(c) KMPL Drive

The Corporation is one of the best in terms of kilometres per litre of diesel. It was 4.75 in 1986. High KMPL appeared to have indirectly resulted in safe driving.

(d) Strict Punishment

Accident punishments were strictly implemented if the crew (driver) was found guilty. Moreover, in this Corporation, there was no union interference if the responsibility of the accident was clear and genuine. Depot managers were given full freedom to punish including termination. This made them more powerful to implement accident control measures.

Accident Cell

Accident cell in the Corporation was purely meant for accident analysis and not for dealing with post accident measures, as in the case of some other corporations. The cell collected complete information of every accident (from FIR), classified and analysed it, and submitted it for the monthly performance review of depots by the MD. Accident cell also suggested steps to be taken and modifications to be made in training programmes.

(f) Speed Control

Every bus was fitted with a speed control device which limited the speed to 60 kmph. A strict vigil was kept on drivers who tampered with speed control device and punishments were meted out. It was understood that the device worked in almost all buses of the Corporation.

(g) Display of posters

"The best way to change the drivers' attitude, is to influence them psychologically. For this we design and display various posters on various aspects of accidents in the bus as well as in those places where the drivers meet often" said Additional Secretary to the Corporation. This practice was in effect even at the time of this study.

CORPORATION 'E' (LEAST ACCIDENT RATE)

On the basis of information collected from Corporation 'E' the following are some of the major actions responsible for the low accident rates in the Corporation:

(a) Control of overspeeding and rash driving

The most important reason for the lowest accident rates in the Corporation, according to the Chief of operations, was controlling speed. "We see that under no circumstances do our drivers do overspeeding or rash driving. This was a prevailing practice in the Corporation and it helped", he remarked.

(b) Categorizing of vehicles and drivers

Vehicles and drivers were classified into groups according to the vehicle condition and crew performance. Drivers in group 'A' were those with proven records in high kmpl and accident free driving and whose age was between 25-50 years. 'C' group of drivers were mainly the newly selected ones, those above 50 years of age, and the ones with bad performance. The rest fell in category 'B'. 25% of the buses belonged to 'A' group, 50% to 'B' group and the other 25% to 'C' group. Drivers in 'A' group were given long routes, overtime, best buses, night halts, and other long route incentives. Moreover, belonging to the 'A' group was a matter of prestige among colleagues. It was understood that there was lot of competition among drivers to jump to a higher group which was done on the basis of yearly performance review. This seemed to have motivated the drivers for safe and high kmpl driving.

(c) Fixation of routes and drivers

The Chief Mechanical Engineer of the Corporation felt the fixation of routes and drivers was a major reason for low accident rate in the Corporation. Every driver was given a particular route and a particular bus, some times two drivers were assigned to one bus. This, he said, was often done at the cost of low vehicle utilization. However it resulted in the driver getting familiar with the route and also feeling a personal attachment towards the bus he handled. Creating such attachment, he felt, went a long way in reducing accidents.

(d) Strict observance of duty hours and holidays

It was the policy of the Corporation, as far as possible, not to give extra duty hours to any crew (especially drivers). Overtime was not given for more than four hours at a stretch. This was because from experience the Corporation had learnt that more than 4 hrs. overtime was likely to result in accidents. Moreover, holidays and rest hours for the crew were also strictly observed. 33% of the crew requirement was always provided extra to take care of casual leave, holidays, etc. so that giving overtime could be avoided.

(e) Strict punishments

Punishments for accidents were strictly implemented and the drivers were given punishments such as suspension, stoppage of increments, recovering cost of damage even to the fullest extent, termination, etc. Some times the drivers

responsible for accidents were not given any vehicle or put in shunting services at the workshop.' This was a sort of demotion affecting the driver's prestige among his colleagues.

(f) Aluminium bus bodies

The Corporation buses had aluminium bodies which only twisted and did not break, whereas steel sheet bodies tend to break and, thus, cause injuries. This, the Chief of Operations felt, prevented many casualties which otherwise might have resulted in major injuries.

(g) Everyday advice to the drivers by Divisional Managers

There was a practice of the Divisional Manager informally meeting all the drivers in the division and talking to them about issues relating to safe driving, concern of the top management towards accidents, etc. This repeated discussion seemed to have worked well in inculcating safe driving among drivers.

However it is worth noting here that the corporation did not have any training programme for drivers regarding accidents for the past 10 years. Moreover it had also not had any awards and incentive schemes for accident free drivers. In terms of kmpl also, the performance of the Corporation was only average.

TRAINING PROGRAMMES

Since training programmes seemed to be an important factor in improving the safety performance, training programmes of four of the five corporations studied, were reviewed (one of the corporations did not have any accident related training programme).

CORPORATION 'A'

Training Programme for Drivers

The corporation had two types of training programmes for drivers.

- (a) Pre-service training, and
- (b) In-service training (refresher course).

Pre-service training was aimed at giving an understanding to new drivers about the corporation, nature of vehicles, desirable driving methods, duties, responsibilities, etc. There was no fixed duration for this programme and candidates who were found to be good were relieved quite early and others were retained, even upto 2-3 months.

Refresher (in-service) training was more corrective in nature because the drivers called for this programme were identified at the depots based on their service records. Hence only those drivers were sent for the programme who were found have been following defective driving practices. Duration of the refresher course ranged from 30 to 45 days. Maximum emphasis (upto 75%) in the programme was on practical training. However certain amount of theoretical training was also given. Special care was given to

individuals according to their particular drawbacks. For example, accident prone drivers who were called for the refresher course were taken for a driving test where the instructor pointed out mistakes and probable causes for frequent accidents. Methods of safe driving were also taught.

Those involved in fatal accidents were given special psychological attention by an expert, who after identifying the driver's personal problems, family background, etc. gave advice to overcome the personal difficulties. However, none of the programmes seemed to be done in an organized way but were done more as a ritual. The Principal, Staff Training School, also agreed with the lacunae of the courses and the need for revamping the whole syllabus and training approach. Answering a query about the post training performance of the drivers, the Principal said that there was an arrangement to get feedback from the depots on the performance of the drivers for three months after the programme but not beyond that period.

Training Programme for Officers

During the past five years the corporation had deputed 215 officers for various training programmes. However all the programmes were either on fuel efficiency, maintenance, materials management, personnel management, information systems, etc. and none of them was on accidents.

CORPORATION 'B'

Fullfledged training programmes in Corporation B started in 1981. Three types of training programmes were conducted for drivers:

- (a) Pre-service training
- (b) Refresher courses for drivers (in-service training), and
- (c) Six months training programme for freshers.

Pre-service training (induction course) had no specific duration. It ranged from two weeks to two months. Those drivers who were able and efficient were discharged quite early if found satisfactory, and in the case of others, training was given till they improved themselves. The training emphasized the following aspects: judgement, anticipation, perception, psychological aspects, knowledge about safety, various parts of the vehicle and how they are reconditioned, driving on different roads (such as plain roads, hilly tracks, etc.) under various conditions (such as day and night driving, driving in rain and mist) and driving on light, medium, and heavy traffic roads. Apart from this various other aspects such as road signals, starting positions, stopping positions, signalling of other vehicles, pre-driving checks (such as oil level, radiator water level, tyre pressure, diesel level, head lights, sideview mirror, etc.) were also emphasized. The total intake of persons for the programme was about 30.

Drivers for refresher course were selected on the basis of constant performance review done at depot level. Thus drivers with driving defects such as high accidents, high fuel consumption, etc. were identified and sent for the programme. Refresher course was of 13 days duration with an intake of around 15 drivers. The programme consisted of both theory and practical classes. However more emphasis was placed on practical training. First of all, drivers were taken for a driving test to check signal observance etc. Next two days were for road training where driving habits were observed and corrected by expert trainers. After this two days were spent on training for hill driving and another two days emphasising on safety and accident free driving. This was followed by theoretical classes in which the drivers were given lectures on the methods and necessity of safe driving. Certain psychological classes to arouse the inner consciousness of drivers by describing to them some post accident tragedies were also arranged. Certain drivers who had been involved in serious accidents and might have been psychologically affected were given special attention by the attending psychologist who collected their complete family and personal backgrounds and gave them advice.

A six months training programme for fresh candidates was another method tried only by Corporation 'B' to arrange for its drivers. This method of arranging for drivers was not very common among RTUs and was reported to have been tried by just one more RTU. Here the candidates between the age

group of 21-27 who had light motor vehicle driving licenses were recruited. It was a strict policy here, unlike in the case of some other corporations, that those having previous experience of driving heavy motor vehicles were not considered. These freshers were given intensive training (both theoretical and practical) including teaching of heavy motor vehicle driving for six months by which they were moulded exclusively for the needs of the Corporation. The Corporation thus trained 48 candidates per year on an average and absorbed them in service. This programme was started in 1984, and though it was too early to get any hard data on their performance, overall their performance was understood to be much better (in terms of kmpl, accidents, dealing with the public, etc.) than the direct recruits with prior experience of driving heavy vehicles. This could probably be a better method of recruiting drivers in future to increase the operational efficiency and safety in road transport undertakings. At present the training school had 13 buses and 35 instructors to conduct the programmes.

Apart from this the Corporation also showed films (7 to 20 mts. duration) to the drivers at convenient times either at the training school or at the depots. The Corporation regularly shows 3 video films on the importance of pre-driving checks to the drivers in all depots between 11 and 12 at night. These were hired from the Institute of Road

Transport, * (IRT) Madras. Some of the films have been imported by IRT, Madras from other countries. Out of the 30 films, almost 25 are directly or indirectly related to safe and accident free driving. Responding to a question regarding the impact of training, a Divisional Manager (Tech), said that accidents were definitely on the decrease, especially the fatal ones (Exhibit I). Unlike Corporation 'A', the DM (Tech) mentioned that the post-training performance was constantly watched and if necessary the persons were again called for refresher courses. One unique aspect about the training school of Corporation 'B' was its direct involvement with the Corporation's functioning. For example as soon as the Managing Director received detailed information report about an accident, it was sent to the training school for study and analysis and the school in turn prepared a consolidated statement if necessary by even calling for some more information from depot. Depending upon the problem, many times it was the school that asked the depots to send particular individuals for training programmes. Since the school already had complete information about the accident and the person, giving relevant corrective training became much easier and highly effective. Apart from the concerned person being

*Institute of Road Transport is a research institute funded by all the Road Transport Corporations in Tamil Nadu.

explained as to how the accident could have been avoided, the major accident spots were noted and during the training period, other drivers were also taken to these spots and explained how particular accidents had happened. Under the MD's initiative, an accident clinic had been started in the training school in Oct. 1987 where complete histories of drivers involved in accidents were kept for ready reference. Such a well coordinated training programme was found absent in the other corporations studied.

CORPORATION 'C'

This Corporation conducted two types of training programmes for drivers. These were:

- (a) Pre-service training
- (b) In-service training

Pre-service training was meant for newly recruited driver trainees and its duration was 7-10 days. The basis emphasis was on aspects such as methods of skillful driving; understanding of vehicle; traffic rules and signals; precautions to be taken while driving on narrow roads, bridges, turning, reversing; driving in various seasons such as monsoons; hill driving; overtaking; driving during day and night times; measures to be adopted to avoid break downs; post accident responsibilities of the driver; important Motor Vehicle Rules; public relations; etc.

In-service training was meant for those drivers who were identified at depots for various driving defects. The course was generally conducted during monsoons when many of the

drivers were comparatively free. The basic intention of the programme was to train drivers who were considered accident prone. Apart from them, those who had completed two years of service, those below the age of thirty three, those involved in frequent break downs, and those with low kmpl. record were also called for training.

The syllabus followed for the in-service training program was same as that of the pre-service training. However, the emphasis varied for each individual depending upon his specific driving defect(s).

The Corporation did not have a training school. The training was imparted at the divisions. However, it was understood that most of these divisions were ill-equipped to conduct such programmes.

It is worth mentioning that the in-service training had been discontinued for the previous five years at the instance of the top management and had been revived only one year back (1986). At the time of this study, the corporation was planning to set up a training school of its own.

CORPORATION 'D'

One major difference between the training programmes for drivers conducted by Corporation 'D' as compared to other Corporations studied was that, while in the case of other Corporations, the training was mostly centralized, in Corporation 'B' it decentralized and every district had a

training centre. The decentralized training programme was started in 1980. Every Regional Training Centre had a permanent faculty which mainly consisted of mechanical staff, foreman, and traffic inspector. Responding to why such decentralization, a Corporation official explained that "the drivers' recruitment itself is done at regional level. Moreover we want to avoid the chaos by calling all the people to one city". The second reason given was very similar to the reason cited by a senior driver in Corporation 'A' for the ineffectiveness of centralized training programme. This advantage of a decentralized programme was that the candidate attending the training need not be away from his family, no loss of income (like collection batta). Moreover, in the case of a large Corporation, centralized training was also difficult.

The Corporation conducted two types of training programmes for drivers:

- (a) Induction training of 12 weeks duration (50 candidates)
- (b) Refresher courses (corrective training).

Both the programmes consisted of theory and practical (syllabus in Exhibits VI & VII). Induction programme was meant for newly recruited drivers and the refresher programme for those already in service. In the induction programme, major emphasis was on fuel efficient driving and safety.

* Collection batta is like a bonus scheme under which the crew (driver and conductor) are paid cash bonus depending on the total fare collected from passengers during trips.

** Fuel efficient driving and safe driving are said to be inter-related since optimum fuel consumption is at a constant speed of 40-50 kmph.

Apart from drivers, the Corporation also conducted a 6-weeks induction training programme for conductors. This programme included lessons on safety and accident control (syllabus in Exhibit VIII). Like other Corporations, refresher courses were mainly offered as a corrective training for those who lacked in certain aspects of driving such as high KMPL, frequent accidents, etc. Drivers were generally identified at depots and sent for the programme during slack seasons. This was a 4-day programme which also consisted of both theory and practical training (syllabus in Exhibit IX).

As in the case of Corporation 'B', it was planned to take fresh ITI students to give them training for one year and later appoint them as drivers. However the scheme was dropped due to some objections from the Motor Vehicles Department.

Drivers' reactions to training programmes

The query "How do drivers react to the training programme?", revealed that almost all of them took it as a blow to their prestige or a sort of punishment. This was especially true for the in-service refresher programmes. Induction training being compulsory for all at the time of entry, did not evoke much hostility. One official in Corporation 'B' said, "Drivers come here (to the training school) with lot of preconceived notions and ego. Many of them indirectly express that they are expert drivers and there is nothing more which can they learn. Though later on they understand the programme in its right perspective, the toughest job is

to initially bring them down to a compromising state". This attitude of drivers towards training probably indicates the need for a better way of identifying the trainees and presenting the importance and purpose of training programmes so that these may not be taken in a negative way. One of the officials in Corporation 'A' said that whenever a driver is sent for refresher course, the specific reasons for his being sent for the course are also explained to him. "Most of them come to attend the programme out of compulsion from superiors", stated a senior official in charge of training.

Some of the reasons cited for such an attitude by various Corporations are as follows:-

- (a) Loss of income such as collection batta and some other unofficial income such as money collected from passengers by allowing excess luggage, etc.
- (b) His normal life gets disturbed since he has to be away from his family, and also the additional expenditure incurred for travelling, etc. This also prevents them from concentrating on the programme.
- (c) Decline of image among the colleagues because of the common belief that a person is sent for a refresher programme because of his inefficiency.
- (d) Lack of proper boarding, lodging, and recreation facilities at many of the training centres.

One of the methods that can be adopted to overcome some of these difficulties is decentralization of training (as in the case of Corporation 'D') so that the candidates need not be away from their home. If this is not possible, "it should be made a compulsory residential programme with reasonably good facilities so that the candidates will be able to share their views and the programme will become an enjoyable experience" said a senior driver instructor in Corporation 'D'. However, it seemed clear that training programmes in many corporations were not well designed nor did they have well qualified faculty and other facilities. Out of the five Corporations studied only two had reasonably good training programmes, in one case it was non-existent, and in the case of other two, these were quite disorganized even after decades of existence.

SAFETY AND ACCIDENT CONTROL MEASURES

There were various methods adopted by different RTCs to ensure safety and control accidents. These measures can be broadly classified as (a) speed control (b) appropriate selection of drivers (c) proper maintenance and better design of vehicles (d) training programmes (e) incentives and rewards (f) rules and regulations (g) punishments (h) post accident action, and (i) other measures. Some of the important measures are discussed below.

(a) Speed Control

Since over-speeding has been identified as one of the major contributors to accidents, speed control measures are

considered an important measure to reduce accidents and improve safety. Considering its promise, it has also been tried by many SRTUs but with mixed success. In corporation 'A', for example, speed control devices which automatically restricted the speed to 60 kmph, were installed in 1000 buses (almost 30% of the total). However, the drivers being accustomed to over speeding, tampered with the devices and these were found to be working in hardly 150 buses. There was a provision of taking action against a driver if it could be proved that he had tampered with the device. In practice, it was very difficult to identify specific individuals because in most of the cases, a vehicle was handled by two or three drivers in one day. The experience of corporations 'B' and 'D' was, however, quite different. In corporation 'B' speed control devices were installed in most of the buses. Though some of them had been tampered by drivers, most of them were in working condition. Corporation 'D' also had a strict system of checking and maintenance of speed control devices at the depots.

In summary, it would appear that merely fitting speed control devices to buses may not have any impact on the accident rate. However, if a system of keeping them functioning and in good working order can be implemented effectively, they can help in guarding against overspeeding which is likely to have an impact on the number of accidents.

(b) Appropriate selection of drivers

The driver being the primary actor in an accident, selection of drivers is an important step in any effort to reduce accidents. While all the STRUs included in this study seemed aware of the importance of selecting the right kind of persons, there were some differences in practice. Corporation 'D' observed strict standards of physical and medical fitness, and driving experience at the time of recruitment. Corporation 'B' had a selection procedure based on a comprehensive driving test conducted by the corporation itself. The prescribed minimum educational qualification for drivers was 8th standard. Recruitment was understood to be generally free from external influence and pressure. In corporation 'C', apart from being tested for driving skill by the Mechanical Engineer, an oral test to examine the candidate's knowledge in accident prevention was also arranged. While a driving test and an interview were also conducted at the time of recruitment to corporation 'A'; unlike many other corporations, the selection was done by the State Public Service Commission and not by the corporation itself. The Corporation had only one nominee on the selection board. An official of the corporation mentioned that chances of inappropriate persons being selected due to pressure and influence were high.

Setting up suitable criteria and procedures for selection, thus, appears to be a very useful step towards enhancing safety in RTUs. However, mere setting up these may not be

enough. What seems even more important is impartial and effective implementation without any extraneous interference or pressure.

(c) Proper maintenance and better design of vehicles

The results of all attempts at appropriate selection and training of drivers will continue to be less than optimal so long as the vehicles which they have to drive are not upto the mark. This brings maintenance and design of buses into sharp focus. Here, again, there were interesting variations among the SRTUs included in this study. Corporation 'C' seemed quite serious and had a system of daily maintenance checks to ensure that only fit vehicles were put on the road. On the other hand, while drivers in corporation 'A' were also instructed to check the vehicles before taking charge, there seemed to be a common understanding that this was also another one of those official instructions which need not really be followed.

Corporation 'B' appeared to have paid considerable attention to design features with a view to enhance safety. Some of the modifications and design features introduced are described below:

- (i) Fail safe brakes had been provided for almost every vehicle which were designed to automatically stop the vehicle once the air pressure came down. This was compulsorily maintained for vehicles operating on high ranges.

- (ii) Headlights of buses were fixed at the extremes to ensure that the entire width of the vehicle would be clearly visible at night. In addition, illuminous strips were fixed on the front and back sides of the buses.
- (iii) Height of the body had been lowered so that pedestrians, cyclists, etc. would not be pulled inside.
- (iv) Automatic light dimmers were installed in some of the buses. However their effectiveness was likely to be limited unless other vehicles also used the same.
- (v) Magna flux . crack detectors were installed to identify hairline cracks inside the front axle during overhaul and maintenance checks.
- (vi) Designs of tools used in the workshop were examined to see how they could be modified to make them safer.
- (vii) Buses plying on hilly areas were painted yellow to enhance visibility.
- (viii) Close attention was paid to brakes, tyres, and steering during daily maintenance.

(d) Training programmes

The training programmes of four of the five corporations were studied in some detail and have already been described in an earlier section. Given below are some of the highlights of these programmes to enable a quick comparison.

While corporation 'A' seemed to have provisions for fairly comprehensive training programmes, the implementation appeared to be more ritualistic than effective. The accident rates also did not reflect any impact of training. Corporation 'B', on the other hand, seemed to have reasonably good and organized training programmes for drivers both prior to joining and while in service. A two-year training programme had recently been started for fresh candidates without experience, with the intention of absorbing them as drivers on successful completion of training. The intention was to recruit 100% of the drivers this way. In addition, even workshop staff were given some safety training such as in fire fighting, proper use of certain dangerous tools, etc. Corporation 'C' also had arrangements for induction training (both theoretical and practical) for newly appointed drivers by experienced instructors. The in-service training for drivers had been discontinued for five years but had recently been re-started. The training programmes in corporation 'D' appeared to be very well organized. A special feature was that training was decentralized. Drivers selected on the basis of type of accident committed and career records were given special training at local training centres. Workshop employees were also given pre-service training with a view to ensuring safety. Another special feature was that lessons on safety and accident control were also included in the induction training programme for conductors.

Corporation 'E' had neither a training school nor any training programmes of its own. A few training programmes for drivers, such as for fuel efficiency, had been conducted by the Petroleum Conservation Research Association (PCRA), TELCO, etc. When asked about corrective training (refresher courses), the Chief of Operations replied that the Divisional Officers instructed the crew regarding fuel efficiency and safe driving every other day which can be considered as oral training. He added that this had a more reinforcing effect on drivers as compared to formal training.

(e) Incentives and rewards

Most of the corporations used rewards and incentives, in some form or the other, to recognize and encourage accident free and safe performance, especially of drivers. In Corporation 'A', for example, drivers who were accident-free for five continuous years were given rewards by some major spare parts manufacturers (such as brake lining companies). These were presented by the State Transport Minister at a function where the drivers' spouses were also invited.

Corporation 'B' has had a reward scheme for accident free driving since 1977. A cash award of Rs.100 was given for the first accident free year. The amount is increased by Rs.25 for every subsequent accident free year. Drivers involved in accidents due to faults of others were, however, not eligible for these rewards. This encouraged defensive driving. Additional incentives for drivers who achieved five years of accident-free driving included cash award of

Rs.500 and a jump in the salary slab. The family members of such drivers were also given preference for educational institutions funded by the corporation. In addition to drivers, there was also an award scheme under which accident-free depots were given awards. The eligibility under this scheme was also linked with the expenditure per km. If this expenditure per km. exceeded a given level, then the depot became ineligible for the reward.

Corporation 'C' had rotating shields to be awarded to accident free depots on the basis of quarterly reviews. There was also a provision of giving two-year extension of service after retirement to drivers not involved in fatal and major accidents during the last two years of service. Corporation 'D' also had a scheme under which financial incentives were given to accident free drivers with the incentive increasing with every subsequent accident free year.

(f) Rules and regulations

One standard way of ensuring compliance of recommended practices is to incorporate them into rules and regulations. This is what most of the corporations have done concerning safety-related practices also. Considering that human error was a major contributory factor in accidents, Corporation 'B' had a conscious policy that, as far as possible, no driver would be given more than eight hours duty in a single day. In corporation 'C', a thorough medical check up was

compulsory for the drivers who were to be recruited. Similarly, periodic testing of eyes was compulsory for drivers above 30 years of age. Corporations 'B' and 'D' had policies of providing periodic instructions to drivers in the form of DOs and DONTs to avoid accidents. Considering the higher chances of accidents in monsoon and winter seasons, Corporation 'D' has a system of issuing special warnings and instructions regarding extra precautions to be taken during these seasons. Regular and surprise line checks were carried out by driver instructors in Corporation 'D' to identify drivers who followed defective driving practices. These drivers were either issued warnings by Depot Managers or were sent for appropriate training programmes. Surprise checking was found to be particularly effective because it kept drivers on alert almost all the time. It, thus, appears that rules and regulations which are (a) thoughtfully framed, and (b) effectively implemented may help in reducing unsafe practices and hence in minimising accidents.

(g) Punishments

Punishment was one of the most common follow up actions taken after accidents in all the SRTUs studied. While punishments were not looked at as an end in themselves, it was definitely considered as a strong deterrent and one of the most powerful weapons to control accidents.

The experience of corporations 'B', 'C', and 'D' in regard to punishments seemed to have been quite good. In these three corporation, persons responsible for accidents were identified quickly and strict punishments were given. In a large number of cases, the crew were found to be responsible. The response of corporation officials, when asked about interference in and resistance to punishments from unions and politicians, varied from "not much" to "extremely low". There was apparently "absolutely no" interference or resistance particularly when the punishment appeared to be justified.

In contrast, the experience of corporation 'A' seemed to be entirely different. While in principle the Corporation did have the power to punish those found responsible for accidents, the almost universal feeling among officers was that, in reality, it was very difficult to punish any one due to constant interference from unions and politicians. There were 13 unions in the corporation during the time of the study. The environment in the corporation was understood to be highly politicized. It was pointed out by one of the officers that a recent agreement between the management of the corporation and its unions stipulated that drivers responsible for accidents should NOT be punished but should only be sent for training. The experience of another officer who was incharge of punishments till about a year back was even more revealing. When he took over, this young officer took accidents very seriously and introduced a

system of immediate fixing of responsibility for accidents which was never done earlier. On this basis the persons found responsible, who in a large number of cases happened to be drivers, were given immediate and strict punishments. Pressures from all quarters such as unions, politicians, etc. were resisted. * Punishments such as recovery of full damages, suspension, termination, etc. were continued which apparently also led to some reduction in the accident rate. However, the pressure on the corporation continued to increase and, finally, the punishment portfolio was taken away from him. This particular officer felt that the major factor responsible for the corporation giving in to outside pressure was the vulnerability of its top management. This was because the chief executive officer of the corporation was not confident of continuing in his post if political leadership was not happy with him for whatever reason. During the time of the study, the Industrial Relations Manager (IRM) was incharge of punishments. Decisions were taken on the basis of First Information Report (FIR) prepared by the persons who attended the site of accident. The employee(s) considered responsible were given time to defend his(their) case(s). If the explanation was not found satisfactory, the IRM proposed a punishment which could be referred to the Managing Director and thereafter to the

*Before joining the Corporation, the officer himself was a wellknown student activist, and also the son-in-law of one of the founding fathers of marxist movement in India. Therefore, he had high political connections, a factor, which he said, made it possible for him to resist the pressure.

Appealate Tribunal by the employee(s). This complicated and complicated and involved process resulted in a situation where the linkage between the punishment and the accident was not clearly visible to the employees and, thus, the potential impact of punishments on reduction of accidents was lost.

These experiences indicate that while punishments can be a useful measure to reduce accidents and improve safety, their real impact depends on how effectively and objectively can they be imposed. So long as there are factors--external or internal--which prevent timely and objective imposition, the effect of punishments would, at best, be limited.

(i) Post Accident Measures

The sequence of actions taken after the occurrence of an accident was found to generally similar in all the five corporations studied (Exhibits X, Xa, Xb, Xc and Xd). However certain differences did exist in terms of the specific procedures followed and attention given. In all the Corporations, accidents were attended by the nearest depot on receipt of information given by the crew (if not injured). The depot's primary duty was to arrange immediate medical services for the victims and to prepare a first information report and a detailed information report. The depot managers were also authorised to sanction a small amount as ex-gratia payment which varied from Corporation to Corporation. This was irrespective of who was responsible for the accident.

The depot also informed the nearest police station who, in turn, prepared its own report and took necessary action. In case of major accidents, the Divisional Controller and officers from the central office also visited the site.

In terms of facilities for taking post-accident action, Corporation 'B' seemed to be better equipped. Each of its depots maintained an ambulance and other essential equipment which were rushed to the site immediately after receiving information about an accident. This was started because, in certain cases, taking the victims to the nearest hospital used to be a problem if proper conveyance was not available and the bus was damaged.

While in Corporation 'A' and 'E', information on accidents was put to hardly any use (except for MACT claims and statistical purposes), in the other three Corporations, information was classified and analyzed by the accident cell and periodically sent to the top management for review and decision making, which included decisions on corrective actions, modification of training programmes, etc. Moreover, some key findings were circulated among the depots so that precautions on those issues could be taken in future. There was also an accident cell in Corporation 'A', but it dealt only with matters arising out of accidents such as settling claims, etc. rather than measures to prevent accidents. Another remarkable difference observed in Corporations 'B' and 'D', was the priority given for accident cases. "I keep away all my other work, when it comes to an accident case",

stated the Chief Traffic Manager of Corporation 'D', which was an indication of the concern by and importance given to an accident.

All the Corporations expressed their concern over rapid increase in the number of accident cases going to the Motor Vehicles Accident Claims Tribunals (MACT). This seems to be due to the comparatively high compensations sanctioned by MACT. Quite a few officers felt that these courts were sometimes irrational and biased against the Corporations.

(j) Other Measures

In addition to the above classification, some other measures taken by some of the corporations are listed below:

- (i) Top management involvement in accident related issues was found to be quite high in corporations B, C, and D. The MDs issued periodic instructions concerning accident-related performance and the need for improving that performance. In corporation D, for example, information supplied by the accident cell was used by the MD to write to those depots and divisions where the accidents rates were high, asking for explanations and suggesting corrective action. This step kept the attention of division and depot level officers focussed on safety. In corporation C, the MD used the yearly analysis of accident rates among various corporations done by the Institute of Road Transport, Madras, to highlight the need for improving his corporation's safety performance.

- (ii) Increasing general awareness of operating staff about accidents and safety was tried by some corporations. Corporation C arranged periodic meetings of drivers at the divisional level in which they were encouraged to discuss about causes of accidents and possible preventive measures. The management also issued periodic appeals highlighting the role of the crew in controlling accidents.
- (iii) Some corporations tried to pay individual attention to operating staff. Individual accident records were maintained for drivers in corporation C on the basis of which drivers who were found to be repeatedly involved in accidents were warned and asked to improve their safety performance. Possible consequences of lack of improvement were also made clear to them. The feeling of being singled out seemed to have had some impact on the drivers.
- (iv) Publicity and posters were very common measures of increasing awareness and creating a psychological impact on drivers. Corporations B, C, and D displayed posters showing scenes of grave accidents, messages and slogans related to safety, etc. at places frequently visited by the crew such as rest houses and refreshment rooms. Frequent changes of posters and designing them with some personal touch for drivers was considered to be useful.

(v) Systematic analysis and follow up was another measure found in some corporations. This, very often, took the form of an accident cell. Corporations B, C, and D had accident cells which collected and analyzed data about accidents, and at times, even suggested corrective and preventive action.

CONCLUDING OBSERVATIONS

Some observations made during the study, which appear to have a strong bearing on the safety performance and accident rates of a corporation, are given below, in brief:

(a) Concern and direct involvement of the top management

In Corporations having low accident rates, the top management constantly reviewed the performance of divisions, depots, and individuals; issued periodic instructions and circulars; and also personally followed up to see whether these were implemented. Involvement from the higher levels, especially from the MD seemed to have a lot of impact on the lower levels in terms of giving priority for areas like safety.

(b) Concern for safety even at times when there were no accidents.

Concern for safety management programmes were an ongoing process in Corporations with lower accident rates irrespective of the occurrence of accidents. For example, periodic review of the depots, maintenance checks, training

programmes, issue of circulars, appeals and posters, screening of films on accidents, etc. were constantly carried out. MD and other top officials spent a part of their time in arranging and reviewing the safety related issues almost every day.

(c) High KMPL

Except in the case of Corporation 'E', other SRTUs with low accident rates also seemed to have a good KMPL performance. This is possibly due to the fact that fuel efficient driving practices amount to safe driving.

(d) Accident Cell

The Corporation with lower accident rates had accident cells attached which collected information on every accident for giving a continuous feedback to the top management for decision making. The only exception seemed to be Corporation 'E', which did not have an accident cell.

(e) Defensive driving

Insistence on defensive driving seemed to be another common characteristic of STUs with low accidents. The feedback given by accident cells of three Corporations i.e. 'B', 'C' and 'D', revealed that more than 45% of the accidents took place due to the fault of others. Hence drivers were advised to anticipate the mistakes of others while driving. In Corporation 'D', drivers are even asked to stop the vehicle for a while if others were found to be driving rashly.

Punishments

Low accident rate Corporations seem to be characterised by strict punishments and less union and political interference. Some of the officials believed that punishments were a very effective tool to bring down accidents since it had a more deterrent value for other drivers than the actual punishment meted out to an individual.

EXHIBIT I

ACCIDENT DATA OF THE FIVE CORPORATIONS STUDIED

CORPORATION-A					
Year	Accidents per lakh Kms	Fatal	Major	Minor	Total
1981-82	2.3	NA	NA	NA	NA
1982-83	2.5	136	490	3747	4373
1983-84	2	151	535	4318	5004
1984-85	1.92	147	587	3925	4659
1985-86	2.2	133	441	4077	4651
1986-87	1.97	129	567	4008	4704
CORPORATION-B					
1981-82		NA	NA	NA	NA
1982-83	0.67	138	269	537	944
1983-84	0.61	83	168	338	639
1984-85	0.64	102	228	359	689
1985-86	0.62	86	220	441	747
1986-87	0.54	53	129	245	427
CORPORATION-C					
1981-82	0.38	276	1359	696	2351
1982-83	0.31	238	1147	509	1905
1983-84	0.33	244	1283	528	2055
1984-85	0.33	251	1396	508	2155
1985-86	0.29	264	837	730	1948
1986-87	0.28	262	824	733	1921
CORPORATION-D					
1981-82	NA	NA		NA	NA
1982-83	0.2	NA		NA	1593
1983-84	0.23	NA		NA	1544
1984-85	0.22	318		1236	1554
1985-86	0.2	314		1372	1686
1986-87	0.2	241		1632	1873
CORPORATION-E					
1981-82	NA	NA	NA	NA	NA
1982-83	0.1	7	49	42	98
1983-84	0.12	5	20	54	79
1984-85	0.08	4	10	35	49
1985-86	0.07	0	4	33	37
1986-87	0.07	3	5	29	37

Source: Report on the Performance of Nationalised Road Transport Undertakings. Compiled by the Central Institute of Road Transport (Training & Research) Pune, for the Association of State Road Transport Undertakings

EXHIBIT II

Selected performance and other indicators (1986-87)

	Name of the SRTU				
	'A'	'B'	'C'	'D'	'E'
1. Total fleet held (As on March)	3019	739	7781	10760	1553
2. Percentage of fleet Utilization	72.3	96.1	81.3	95.4	42.8
3. Average Age of vehicles	6.6 years	3.28 years	3.82 lakh kms.	--	6.42 years
4. Gross km run during the year (lakhs)	2401.23	800.31	6905.13	9641.33	547.41
5. No. of schedules* operated	3032	350	5785	7041	1292
6. Number of passengers carried (in lakhs)	7562.60	3368.07	13511.06	20224.44	226.04
7. No. of routes					
(a) Town	3827	411	14699	4628	574
(b) Mofussil		203			
8. Breakdowns per 10,000 kms.	1.10	0.20	0.39	0.47	0.79
9. Staff strength	30654	5334	47542	79775	11439
10. Average steering and (spreadover duty)	6.30 (8.00)	NA	6.08 (8.01)	7.30 (9.00)	NA
11. Load factor (% age)	83.0	63.2	61.4	NA	63.0
12. KMPL	3.68	4.17	4.90	4.85	3.88
13. Profit (loss) (in lakhs)	(-1890.00)	(-216.88)	(-4440.03)	707.81	(-1826)
14. No. of divisions		3	14	22	11
15. Percentage of city service to the total effective kms.	9.17	70.12	3.95	12.55	NA

* 1986 data

Source: Report on the Performance of Nationalised Road Transport Undertakings compiled by the Central Institute of Road Transport (Training & Research) Pune for the Association of State Road Transport Undertakings

EXHIBIT III

ACCIDENT COMPENSATION PAID* BY CORPORATIONS A, B, C, D, AND E

YEAR	A	B	C	D	E
1979-80	NA**	NA	NA	NA	751980.00
1980-81	NA	NA	NA	NA	551710.00
1981-82	2589754.32	NA	NA	3354301.00	NA
1982-83	2859188.63	1934000.00	18274719.00	3473961.00	NA
1983-84	4693028.80	2645000.00	19363442.00	7781654.00	NA
1984-85	4947447.08	4900000.00	14858553.00	10554825.00	NA
1985-86	7209916.16	4300000.00	29135549.00	10970352.00	NA
1986-87	15818651.00	7485000.00	14948621.00	NA	NA

* Based on data collected from the respective Corporations

** Data not available

EXHIBIT IV

STEPS TAKEN BY THE CORPORATION FOR PREVENTION OF ACCIDENTS

- (1) The Corporation has prescribed the qualification and experience for the post of Driver as under:-
 - (a) Fourth Standard Pass
 - (b) Public Vehicle driving licence from R.T.O.
 - (c) At least 4 years driving experience of preferably heavy vehicles including diesel.
 - (d) Eye sight as required under B.M.V. Rules
 - (e) Height 5' x 4" (Minimum)
 - (f) Age 25 to 50 years.

Before the driver is appointed, the Trade Test is taken by the M.E. or Sr. D.M.E. of the division. The final test of the driver who has been passed in the first test is taken by the M.E. (O). When the candidate fulfill the requirements and passes through the tests and oral examination regarding prevention of accidents only then he is called before the Selection Committee.

(2) Before his appointment as driver, the candidate is required to undergo medical examination. Also during the tenure of his service whenever it is found necessary, he is required to undergo medical tests for his eye sight. Further, the driver in the age group between 30 and 40 are also tested for eye sight.

(3) Before the candidate is appointed regularly to the post of driver, he is required to undergo training for a period of 7 days. In addition to this, a system of imparting practical training on scheduled buses to newly recruited drivers with the help of the good and experienced drivers during duty hours, has been in force.

(4) Each driver is given a list of instructions for prevention of accidents. Meetings of drivers are held periodically to discuss various causes of accidents. In this way the drivers are made aware of their duties and of the loss of lives as a result of accidents. Over and above, booklets on the subject of how to avoid accidents and the DO's and DON'Ts for the drivers and conductors have been distributed to all drivers and conductors.

(5) Every accident is scrutinized by an Officer of the Division and if he finds somebody responsible for the accident, departmental action is taken against him which has a deterrent effect on other drivers.

(6) A rigid procedure for daily maintenance of vehicles has been laid down to ensure that only road-worthy vehicles in fit condition are put on road for operation. Drivers are required to fill out a "defect slip" at the end of the trip to report any defects which they may have noticed on the run. The "defect

slip" is then used as a guide for maintenance and repair.

(7) The Corporation issues appeals at frequent intervals, to the drivers for prevention of accidents.

(8) Instructions for prevention of accidents are repeated at frequent intervals.

(9) The Corporation has also prepared several posters which impress upon the minds of the drivers for prevention of accidents and these posters are exhibited in the rest rooms of drivers and conductors.

(10) Film shows are arranged at different Depots of the Corporation to educate the drivers in the prevention of accidents.

(11) Drivers who are frequently involved in accidents are kept under watch. They are also informed that they are under watch regarding their driving habits etc.

(12) Divisional Controllers are advised to be in touch with the local authorities for providing sign-boards and preparation of island at places like narrow bridges, cross roads, 'U' curves, etc., which may help in prevention of accidents.

(13) The Corporation has set up a Cell in its Central office to study the accidents and analyse them weekly, monthly, and annually. The Cell analyses accidents, relating to various causes and their percentages to the total accidents and necessary instructions are issued from time to time for prevention of accidents. The Officers from Divisions during their inspections of the Units and also the line checking staff ensure that the instructions issued for prevention of accidents are properly followed. During the course of their duties, the Central Line Checking Squad attached to Central Office also checks the implementation of instructions for prevention of accidents.

(14) For healthy competition a scheme for awarding a rotating shield has been introduced in the Corporation. The depot which has no Fatal, Major, Serious or Minor accidents continuously three months is awarded the rotating shield.

(15) The Corporation has acquired two more projectors for showing documentaries to imparting training their employees on accident free driving.

(16) The Corporation also celebrates a "Safety Week" in all divisions from 4th March to 10th March on occasion of "National Safety Day" on 4th March of every year, to focus attention on safety.

(17) The Corporation has purchased 3 Units each of proto Glare and Proto Clainic machines and with the help of these machines

eye sight test of drivers is taken. On watching performance of these machines, the question of purchasing more Units is under consideration.

(18) The Corporation has purchased 3 Units of Deplar Radar machines and with the help of Deplar Radar Units over speeding of the vehicles are checked by the Line Checking Staff and if S.T. Employee is found responsible exemplary action is taken against him.

(19) The divisions are also planning no accident week.

(20) The Drivers who are due to retire at the age of 58 and have not been involved in any fatal or major accident and have not committed major default during the period of last years, are reappointed for a period of two years on Daily Wages.

(21) As a result of measures taken by the Corporation as mentioned above, the rate of accident per lakh Kms. has been gradually reduced It has come down from 0.98 in 1960-61 to 0.28 in 1986-87

Exhibit V

Circular issued by Corporation D

Accident analysis for the month of October, 1987, both fatal and major - compared to the corresponding month of last year.

This month 91 accidents have taken place, of which 37 are fatal and 54 are major, as against the total accidents of 78 during the corresponding month of last year, i.e. there is an increase in the occurrence of accidents.

A number of 65 accidents, out of the total of 91, have been caused by drivers of ordinary bus services, and of the total, 80 accidents occurred on plain roads. This will confirm that drivers of ordinary services are resorting to rash driving and are contributing to more accidents. 65 of these accidents have taken place in the day time only.

REGION WISE REVIEW

Region 'A' has contributed to the highest number of accidents (24, of which 7 are fatal and 17 major) and has the highest accident rate of 0.15 / lakh kms.

Regions 'B' and 'C' have contributed, 15 and 12 accidents respectively with 0.14 accident rate each.

DIVISION WISE REVIEW

Division 'W' had contributed 8 accidents (4 fatal and 4 major) with the highest accident rate of 0.26 / lakh kms.

Division 'X' had contributed 7 accidents (4 fatal and 3 major) with an accident rate of 0.25.

Divisions 'Y' and 'Z' have contributed 10 and 7 accidents respectively with accident rates of 0.24 and 0.19 respectively.

SUGGESTIONS

1. Stern action should be taken on drivers, who are consistently involved in accidents.
2. Drivers should be thoroughly educated about the "Safe Driving Skills".
3. A modified and attractive scheme of rewards of accident free drivers should be spread among drivers.
4. Driving instructors should be entrusted with the job of inculcating good driving habits among the drivers.
5. Periodical medical check-up and directing the drivers for special training is a must.

6. Ensuring mechanical fitness and fitment of speed control devices to all the buses should be given top priority.

CORPORATION 'D'

From Managing Director

Circular No.13/87-OPD(C). Dt. 18-3-1987.

Sub: ACCIDENTS - Growing rate of accidents - Steps to be taken by the Depot Managers - Comprehensive instructions on accidents - issued - Regarding.

News about deaths in Corporation 'D' bus accidents is hitting the head lines almost every day. During my perusal of Dak, I find more number of FIR's on accidents than other papers and such tragic incidences make depressing reading.

Any accident should be a serious concern for all the Managers. Death or injury of the passengers in the accidents will badly affect the image of the organization apart from causing untold miseries to the families of those involved in the accidents.

From the perusal of the accident analysis statements, it is observed that the number of fatal accidents is high, which is a matter of serious concern. It should therefore be our endeavour to see that this rising trend of accidents is arrested at once. Therefore the following guidelines are issued in supersession of all the previous circulars on the subject cited above.

SAFETY MEASURES

All the drivers shall be enlightened of the need to adhere to the following safety rules scrupulously to avoid incidence of accidents.

1. Over speeding to be avoided.
2. Sudden swerving and sudden stopping to be avoided.
3. Overtaking, on the face of incoming traffic, to be avoided completely.
4. Crossing over a narrow bridge or a culvert on the face of traffic in the opposite direction to be avoided.
5. Smoking while steering, driving with one hand or talking to others while driving to be avoided.
6. While negotiating an unmanned railway crossing, the conductor/driver of the vehicle shall alight and ensure that the track is clear on either sides and then only cross.
7. In the monsoon season the roads would be wet and swampy due to rains, hence careful and cautious driving is essential.

8. While crossing unbridged streams and flooded causeways, attempts should not be made to cross, without ascertaining the depth of water and possibility of passing through safely.

These safety slogans shall be painted in the Depot Garages or bus stations at conspicuous places.

EXHIBIT VI

THEORETICAL TRAINING PROGRAMME FOR DRIVERS IN CORPORATION 'D'

Name of the Subject, content and suggested status of lecturer

Session No.	Subject and content	Suggested status and position of lecturer
(1)	(2)	(3)
1.	50 years History of the Corporation - Growth - NSR RTD - HS RTD - AP RTD - APSRTC - Different phases in the development of R.T.C. to its present status.	Senior Scale Officer
2.	Important Provisions of Motor Vehicles Act 1939 with relevance to a driver - Necessity for a permit.	DM/ATM
3.	Indian Penal Code - Penalties Imposed for various offenses	Law Officer/ Advocate
4.	Charge Memo - Passengers Statement - Importance of on the spot statement times of check or accidents.	DM/ATM/CI
5.	Enquiry procedure followed relating to crew offenses - Appeal procedures.	DM/ATM/CI
6 & 7	Accidents - types of Accidents (MTA, MTS, MTC) - Causes and precautions - Role of Driver in preventing accidents - Procedure to be followed by the crew in case of accident - Necessity to report at the Police Station - Obtaining of Statements of passengers - Liabilities of RTC for payment of compensation in accident cases - Motor Transport Accident Tribunal.	DM/ATM/CI
8 & 9	Accident analysis - Results and findings of research teams as well as RTC Officials	DM/ATM/CI
10.	Accident agreement - Recovery from drivers in cases of accident.	DM/ATM/CI
11.	First Aid to be rendered to the injured in case of accident - Use of First Aid Box	Fire Station Officer

Contd...

12 & 13	Fire prevention - Steps to be taken Driver in case of fire accident - Use of fire extinguisher.	Fire Station Officer
14 & 15	Film shows - Golden Jubilee - Accident prevention - Fuel conservation - Tyre Economy.	Training Officer
16 & 17	Importance of good driving - Role of tachograph - Analysis of graph readings - speed control - Fuel savings.	Dy.CME/WM
18 & 19	Necessity for maintenance - Preven- tive Maintenance procedures, adop- ted in the Corporation - Daily, weekly, Chart-III, Chart-IV.	WM/AWM

EXHIBIT VII

PRACTICAL TRAINING FOR DRIVER TRAINEES - CORPORATION 'D'

(To be given in the Laboratory attached to the Training Institute)

Subject & Content	Objective
Brake system - Hydraulic/Vacuum/Air pressure/Mechanical and their combination - Brake fluid - Master cylinder - Air compressor - Unloading valve - Air reservoir - E.I. valve - Brake chamber - Slack adjuster - Brake shoes, Brake liner shoe resting spring Air gauge - pressure build up - Fail safe brake system - Dual brake system - Hand brake - Common defects in brake system.	The trainee must be able to identify the various parts and know their functions - shall be able to bleed the hydraulic system and adjust brakes.

PRACTICAL DRIVING TRAINING ON THE ROADS

Subject & Content	Suggested status and position of lecturer
Driving signals & Road signals - Drivers signals - Police signals - Road signals - Traffic signals. (Visit to a traffic school)	Traffic Police Officer
Current method of starting & stopping an engine and vehicle Acceleration - Deceleration - Use of clutch - Double declutching & declutching for change of gears.	Driving Instructor
Braking - Looming into the instruments on the dash board - Use of wiper, dipper, head lights, roof lights - Checking inflation of tyres, checking of radiator water, fuel in fuel tank, engine oil in sump.	Driving Instructor
Use of brakes - Level road - up gradient/ down gradient.	Driving Instructor.
Practice in changing of gears up and down on level road - Upgradient - Down gradient.	Driving Instructor
Steering control practice - Right turn - Left turn - Steering lock - Figure of 8 - Hair pin roads.	Driving Instructor

Over taking and crossing	Driving Instructor
Reversing and parking in slots - Under guidance - Without guidance	Driving Instructor
Driving in open space & mofusil area - State Highways	Driving Instructor
Driving in Suburban area	Driving Instructor
Driving in City roads	Driving Instructor
Driving on ghat roads	Driving Instructor
Driving in nights	Driving Instructor
Driving on light vehicles	Driving Instructor
Long distance driving	Driving Instructor
Driving on VLTs. road	Driving Instructor
Driving to prevent accidents and driving with a tachograph	Driving Instructor

EXHIBIT VIII

TRAINING PROGRAMME FOR CONDUCTORS IN CORPORATION 'D'

(Name of the subject, content and suggested status of lecturer)

Session No.	Subject & Content	Suggested status and position of lecturer
1	Accidents - Types of Accidents (MTA, MTB, MTC) - Causes and precautions - How they are controlled - Role of Conductor in prevention of accident, Procedure to be followed by a Conductor in case of accident - Necessity of reporting at the Police Station - Obtaining of statements of passengers - Liabilities of RTC for payment in times of accident.	DM/ATM/CI
2	First Aid to be rendered to the injured in case of accident for Fire out break - Use of First Aid Box - Fire Extinguisher.	ATM/CI
3	First Aid Classes	Medical Officer

4 DAY REFRESHER COURSE FOR INSERVICE CONDUCTORS (CORPORATION D)

DATE	Ist session Time 9.30 to 11.00 hrs.	IIInd session 11.15 to 12.45 hrs.	IIIrd session 13.30 to 15.00 hrs.	IVth session 15.15 to 16.45
	Subject: Inauguration. Faculty:	Duties and responsibilities of a conductor	Employee counselling.	Maintenance & care of the vehicle
	Subject: Operation of buses-Problems enroute. Faculty:	Break downs/Concept of Productivity.	Incentive schemes for crew.	Accidents -- Prevention Action be taken.
	Subject: Crew links/Bus links/Bus utilisation. Faculty	Absenteeism & Communications.	Suggestion scheme & Grievance procedure-Interaction with passengers.	Elements of computerisation. Role of Unions.
	Subject: First Aid- Personal Hygiene Faculty:	Team work, Co-ordination, discipline.	Public Relations.	Concluding session
	TEA BREAK : 11.00 to 11.15 Hrs. 15.00 to 15.15		Lunch Break : 12.30 to 13.30 Hrs.	

TRAINING OFFICER (GR).

EXHIBIT X

ORGANIZATIONAL STRUCTURE DEALING WITH ACCIDENTS I CORPORATION 'A'

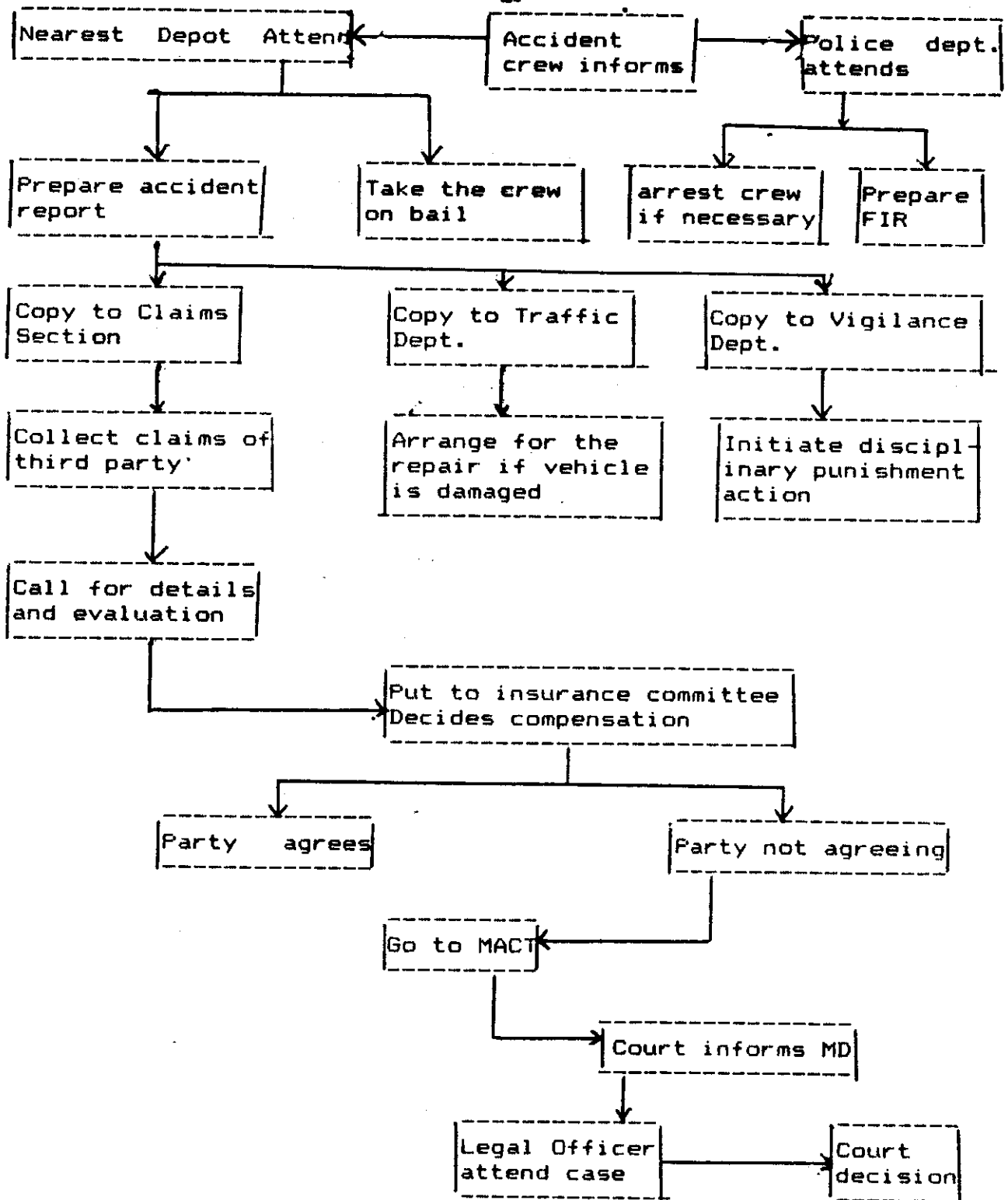


EXHIBIT X-a

ORGANIZATIONAL STRUCTURE DEALING WITH ACCIDENTS CORPORATION 'B'

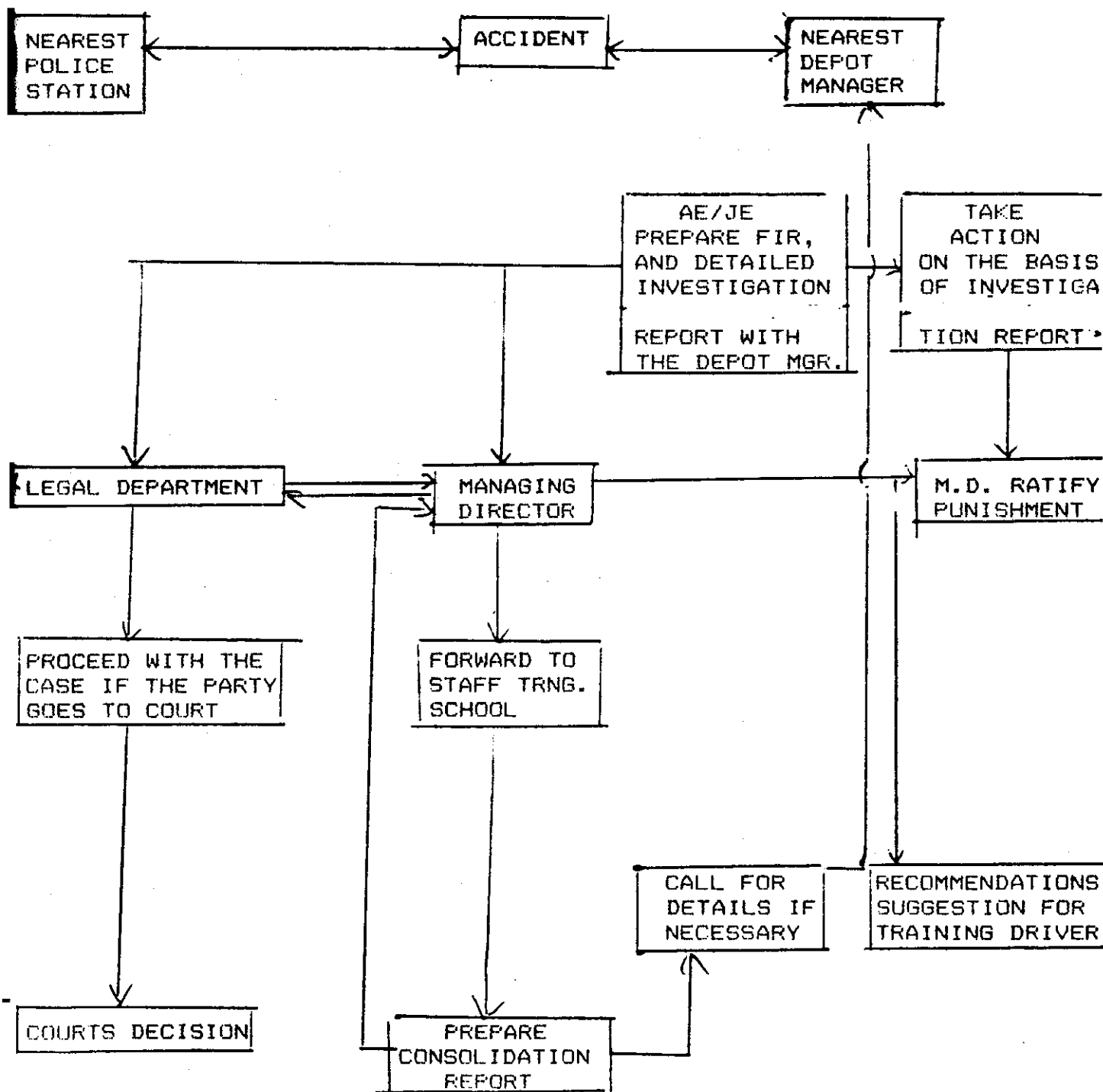
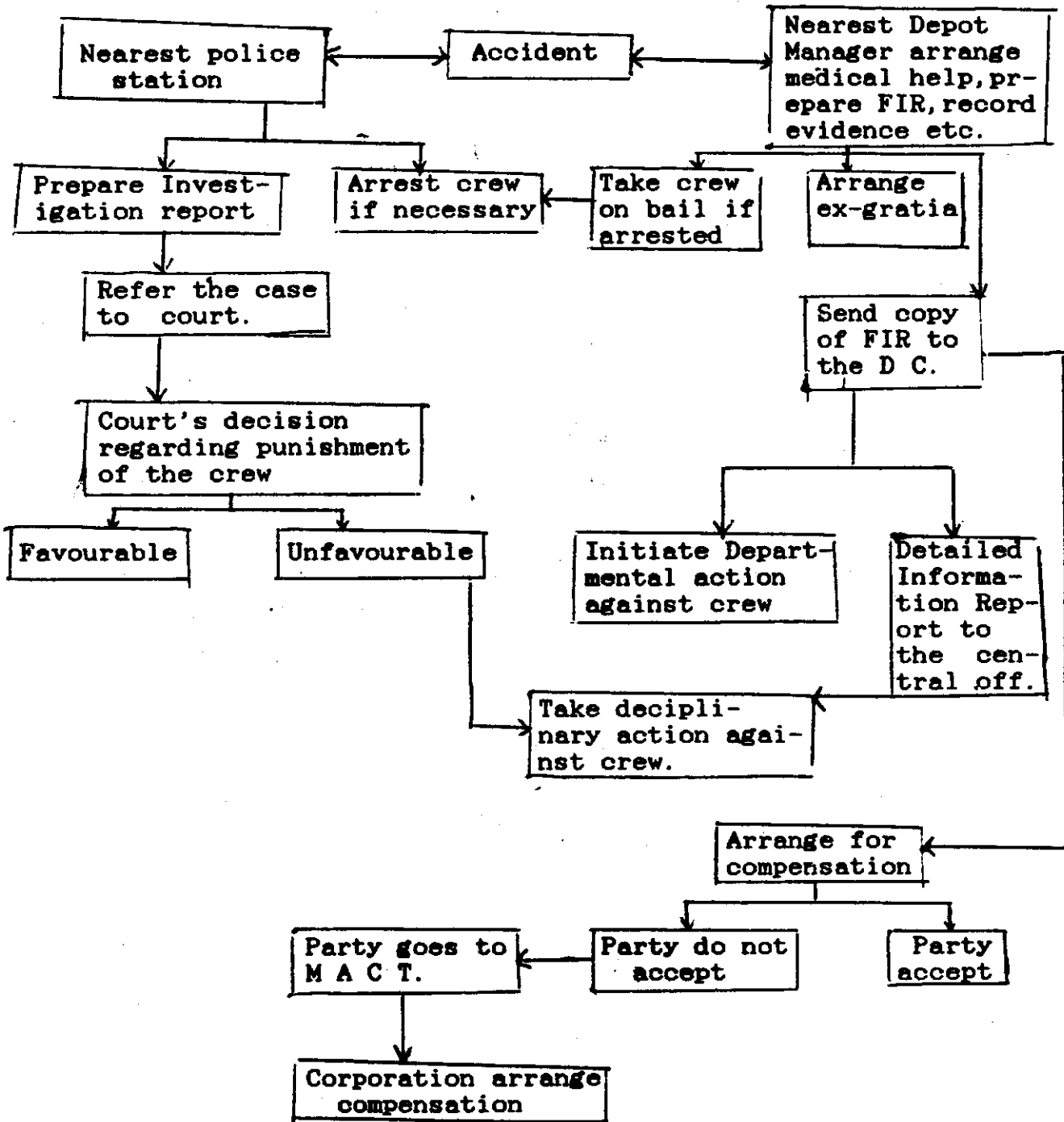
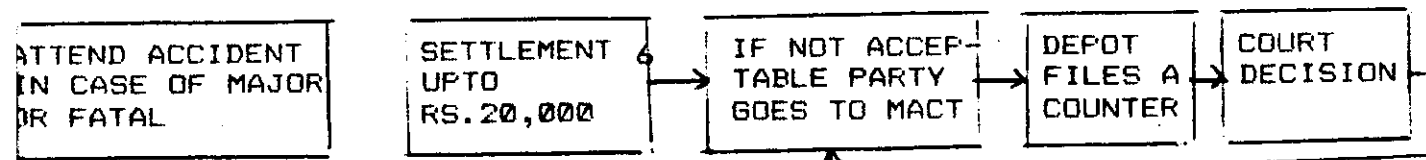
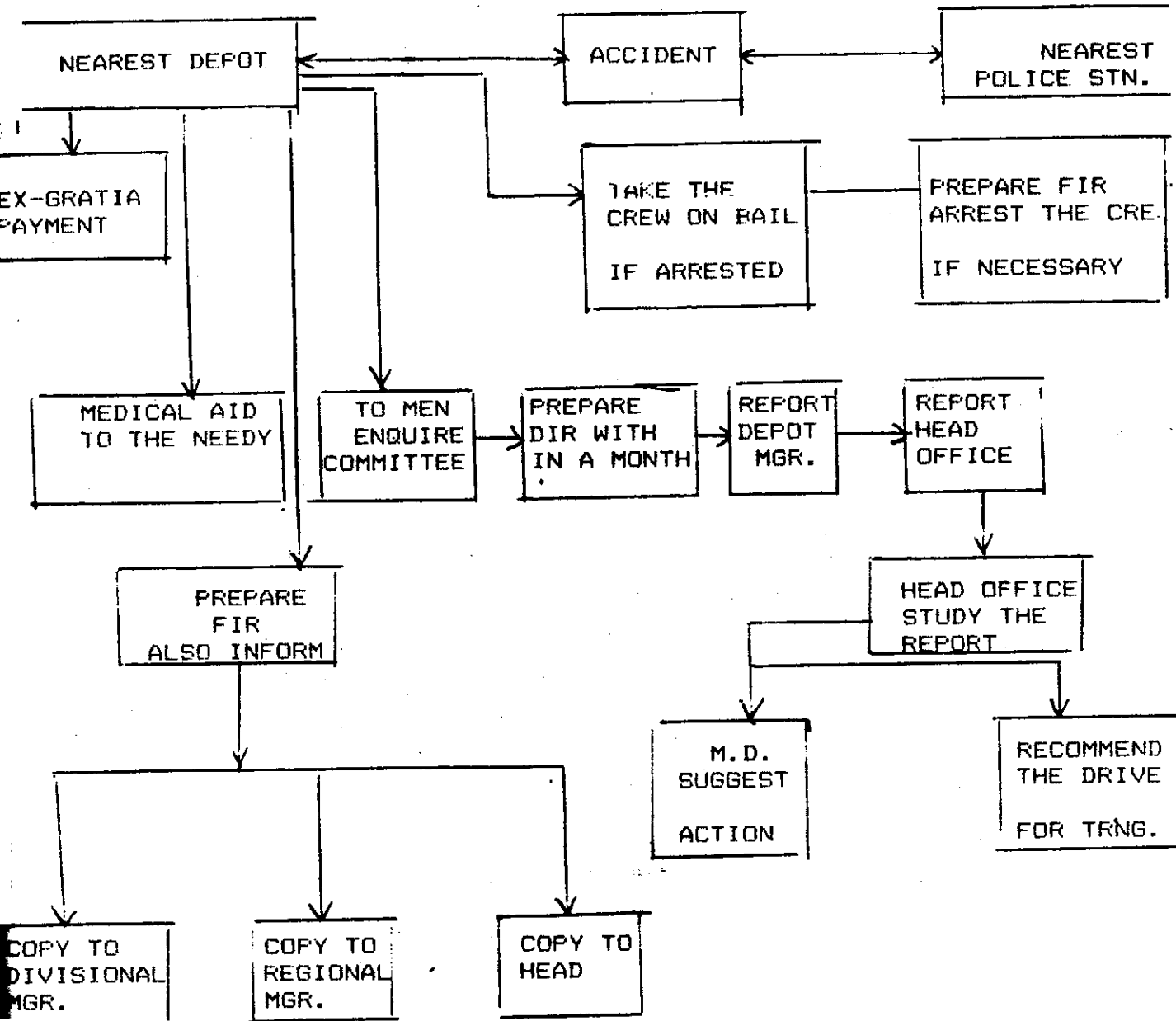


EXHIBIT X-b

ORGANIZATIONAL STRUCTURE DEALING WITH ACCIDENTS-CORPORATION 'C'.



ORGANIZATIONAL STRUCTURE WHICH DEALS WITH ACCIDENTS CORPORATION - 'D'



EXHIBIT

ORGANIZATIONAL STRUCTURE DEALING WITH ACCIDENTS, CORPORATION 'E'

