

# **REPORT OF THE DIRECTOR OF AUDIT**

## **PROVISION OF EMERGENCY SERVICES**

### **MAURITIUS FIRE AND RESCUE SERVICE**



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## ABBREVIATIONS AND ACRONYMS

ARFFS	Airport Rescue and Fire Fighting Service
CEB	Central Electricity Board
CR	Control Room
CWA	Central Water Authority
FSMW	Fire Services Mechanical Workshop
GFS	Government Fire Services
IRM	Integrated Risk Management
IRMP	Integrated Risk Management Plan
MoFED	Ministry of Finance and Economic Development
MFRS	Mauritius Fire and Rescue Service
NAO	National Audit Office
NFPA	National Fire Protection Association
OiC	Officer in charge
OSHA	Occupational Safety and Health Act 2005
PBB	Programme Based Budgeting
PES	Port Emergency Service
UK	United Kingdom



## EXECUTIVE SUMMARY

The main responsibility of Mauritius Fire and Rescue Service (MFRS) (ex GFS) is prevention and suppression of fires and the protection of life, property and environment in case of an emergency. Over the years non-fire emergencies have been included in its mandate. The services provided by the MFRS are through Fire Fighting, Emergency Operations and Rescue Services, Special Services and Fire Prevention. It has adopted a two-pronged approach namely: reactive through response to emergencies and proactive through prevention and emergency preparedness. This report deals with fire and non-fire emergency services provided by the MFRS.

### *Key Findings*

- The strategic plan for the period 2010 to 2015 was not fully implemented. It was not followed by detailed implementation plans and financial strategy. Despite the efforts of MFRS to prevent and suppress fire and non-fire emergencies there is still an increasing trend in fire statistics from 2009 to 2013.
- The preparation of an IRMP involves several activities which call for additional resources. MFRS started the first step towards the formulation of an IRMP. However, the implementation of the different activities was not linked to a plan with clear targets and resources requirements.
- Resources were allocated to attending Special Services which include both emergencies and non-emergencies. For the period 2009 to 2013, although MFRS could not attend all the emergencies, it attended almost all the non emergencies calls using costly resources at either a minimal fee or free of charge.
- Sugar Cane field fires and grass/bush/rubbish/forest calls have increased by almost 80 percent from 2009 to 2013. MFRS has been experiencing difficulties in limiting sugar cane field fires and grass/bush and forest fires.
- For the period 2010 to 2013 the Fire Safety Division did not carry out regular post certification inspections to ensure that the owners are complying with the conditions of the certificate. From 2010 to 2011 regular inspections of night clubs, cinema hotels and other premises were also not carried out. From 2012 onwards it started carrying out inspections. Fire Safety Education was not a planned activity that targeted the most vulnerable group to fire incidents and did not measure the outcomes of fire safety education activities.

### *Conclusion*

MFRS has been operating in an environment that has constantly been changing over time. This has put more pressure for the demand of services of MFRS. Our findings indicate that MFRS has been experiencing difficulties in providing an adequate level of service.

## ***Recommendations***

### *(i) Implementation of strategic plan*

MFRS should, based on lessons learnt from the past, prepare detailed implementation plans which should include, amongst others, activities to be undertaken, objectives of the activities, tasks to be performed, people assigned, milestones and deliverables on a short term, medium term and long term basis.

### *(ii) Producing an Integrated Risk Management Plan*

MFRS may consider the formulation of a roadmap, detailing the activities involved in preparing an IRMP with clear targets, how to raise funds, expertise and administrative support for this IRMP. MFRS can also prepare a synopsis of the importance of IRMP and make preliminary demand for necessary funding from MoFED.

### *(iii) Focusing on core activity*

The MFRS needs to focus on its core activities that are preventing, suppressing and protecting life and property against any fire and non-fire emergencies, and consider conferring services like flushing and supply of water to local authorities.

### *(iv) Sugar Cane field and grass and bush/forest fires*

MFRS alone may not be able to reduce the occurrence of these types of fires. There is a need for a cost effective approach that tackles the problem before fire starts. The emphasis must be on the prevention of fire, rather than on using costly methods of dealing with fire after it has started. This can be done by working in collaboration with owners of sugar cane fields and other land owners.

### *(v) Fire Prevention Activities*

- In order to ensure that building owners are complying with the fire safety guidelines and fire safety requirements are maintained at all times, post certification inspections need to be done at regular intervals.
- Regular enforcement inspections need to be carried out at high risk places like night clubs, cinemas and hotels in order to make everyone comply with the law.
- A fire risk assessment of workplace should be carried out and follow up action be undertaken to keep it a safe place to work.
- Aggressive fire safety and emergency preparedness community outreach programmes should be planned and carried out on a regular basis.



# CHAPTER ONE

## INTRODUCTION

### 1.1 Introduction to emergency fire services in Mauritius

Emergency fire services in Mauritius are currently provided by the following organisations:

- *Mauritius Fire and Rescue Service (MFRS)(ex GFS)* operating under the aegis of the Ministry of Local Government and Outer Islands, providing fire prevention and protection services in Mauritius and outer islands except Rodrigues. It also supports the ARFFS and PES in case of emergencies.
- *Airport Rescue and Fire Fighting Service (ARFFS)* providing fire safety and protection to the airport only and operated by the Airports of Mauritius Ltd.
- *Port Emergency Service (PES)* providing fire prevention and protection services to the Port Louis port area only including harbour and operated by the Mauritius Port Authority.

The main responsibility of the MFRS is prevention and suppression of fires and the protection of life, property and environment in case of an emergency. Over the years non-fire emergencies have been included in its mandate. This report deals with fire and non-fire emergency services provided by the MFRS.

### 1.2 Audit Motivation

Several reviews of the MFRS have been conducted in the last decade. The operation of the MFRS at major fires has been the subject of close scrutiny by the local media and community during that period. Several criticisms that were levelled are as follows:

- Delays in responding to incidents
- Inadequate equipment and appliances
- Inadequately trained fire fighters
- Inadequate water supplies for fire fighting

Frequency of fires in sugar cane fields has been increasing over the years. Despite MFRS intervention, the extent of damage has been increasing and this impacted negatively on the sugar production. Similarly, outbreaks of fires in residential buildings have been increasing and claiming an average of five fire deaths annually.

During torrential rain periods due to high level of calls and when many people are affected at the same time, the MFRS could not attend on time to all requests for evacuating flood water from residential premises with existing resources. On the other hand the amount of compensation paid by the Government (Ministry of Social Security, National Solidarity and

Reform Institutions) to individuals for damage caused by house fires and flood water is increasing.

This indicated that the MFRS experienced difficulties in providing adequate emergency services and this represented a material risk to life, property and environment.

This motivated the NAO to carry out a performance audit on the emergency services with regards to safety of people and the prevention of damage to property and environment.

### **1.3 Audit Objective**

The objective of this performance audit is to assess whether the level of service delivery of MFRS is adequate.

### **1.4 Audit Scope**

The focus of this report is the services provided by MFRS. The services examined are the responses to emergencies, fire prevention activities and the state of preparedness in terms of personnel, vehicles and equipment.

The audit covered the period 2009 to 2013 and the whole island of the Republic of Mauritius excluding Rodrigues, Agalega and other outer islands. It also excluded fire emergency services provided by the PES and the ARFFS.

### **1.5 Audit Design**

The audit examined whether MFRS:

- Is successfully implementing its strategic plan?
- Has been effective in fighting fire?
- Has been effective in rescue service?
- Has developed a risk management plan to link identified risks to resources?
- Has been effective in carrying out its fire prevention activities?

### **1.6 Methodology**

The audit was conducted in accordance with International Organizations of Supreme Audit Institutions standards. Those standards require that performance audit should be planned, conducted and reported on, in a manner which ensures that an audit of high quality is carried out in an economic, efficient and effective way and in a timely manner. Different methodologies were used for the audit to understand the audit area along with obtaining sufficient, relevant and reliable audit evidence that supports the conclusions and recommendations.

The team reviewed relevant documents and files relating to the activities of MFRS. It also referred to relevant laws and regulations, discipline code, reports and policies to identify assessment criteria. The team interviewed different grades of officers from the MFRS. The team visited Coromandel Fire Station to familiarise with the work process, resources utilised and the physical infrastructures in place. The team carried out literature reviews of fire and rescue activities in other countries to learn and identify good practices.

### **1.7 Data validation process**

Management of MFRS was provided with the audit criteria, findings and recommendations to confirm their relevance, accuracy and suitability respectively.

### **1.8 Structure of the Audit Report**

The remaining part of the report covers the followings:

Chapter Two presents a Background and System Description of the MFRS.

Chapter Three presents the Findings and Analysis.

Chapter Four contains the Conclusion based on the findings and analysis.

Chapter Five deals with Recommendations to address shortcomings identified in this report.

## CHAPTER TWO

### BACKGROUND

This chapter provides background information on the activities and processes at the Mauritius Fire and Rescue Service in attending both emergencies and non emergencies and fire prevention and protection.

#### 2.1 Legal Framework

The MFRS is a Department which operates under the *aegis* of the Ministry of Local Government and Outer Islands. It has a separate budget and a structure of its own. The Chief Fire Officer who is the head of the department manages the day to day operation of the organisation.

The Fire Services Act was enacted for the establishment of GFS in 1954. It stated that the fire services have the main duty to protect life and property in case of fire. Since then the Fire Services has evolved to adapt to the rapidly changing socio-economic environment of the country as it is the case worldwide.

In June 2013, Government introduced the Mauritius Fire and Rescue Service Act to provide for the setting up of the Mauritius Fire and Rescue Service (MFRS). The main objective of the Act is to make better provision for the prevention of and response to fires and other events likely to endanger the life of persons, animals, property or the environment, and enhance coordination and harmonise working relationships among emergency organisations. The Act was proclaimed on 5 February 2014. The activities of MFRS are also governed by other enactments such as OSHA, Inflammable Liquid and Substance Act, Residential Care Home Act, Dangerous Chemical Control Act and Road Traffic Regulations among others.

#### 2.2 Duties of the MFRS

Duties of the MFRS have been defined as per Section 5 (2) of the MFRS Act as follows:

- prevent, fight, control and extinguish fires
- protect persons, animals, property and the environment against fire or any other emergency
- advise the public on prevention and protection measures in the event of a fire or any other emergency
- conduct training courses in relation to any aspect of fire safety and emergency preparedness
- organise community education and awareness programmes relating to fires and other emergencies

- assist the relevant authorities in promoting safety in buildings
- cooperate with any entity that provides a service in case of emergency, including intervention at sea
- provide rescue and extrication services to any person, animal or property endangered as a result of a road or other accident, including one which does not involve the risk or existence of a fire
- perform humanitarian services, including the protection of life and property, in the event of any calamity or natural disaster

The term emergency means a serious, unexpected and potentially dangerous occurrence, such as a fire, flood, storm, explosion, landslide, terrorist act, accident, sea surge on land, leakage of harmful substances or oil spill, which requires a significant and coordinated response and which:-

- endangers, or threatens to endanger the safety or health of persons or animals, or
- destroys or damages, or threatens to destroy or damage property or the environment.

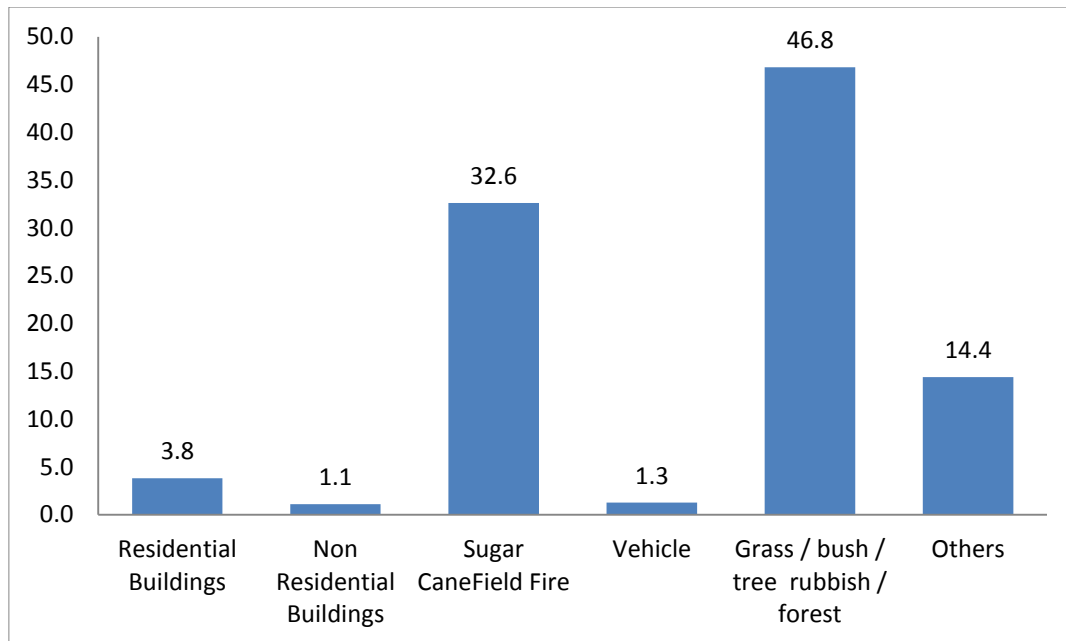
### **2.3 Services provided by the MFRS**

The services provided by the MFRS are classified in three categories:

- Fire Fighting, Emergency Operations and Rescue Services
- Special Services
- Fire Prevention

### 2.3.1 Fire Fighting, Emergency Operations and Rescue Services

The MFRS protects life, property and environment against destruction by fire by deploying personnel, plant and equipment and vehicles. Calls received in respect of each type of fire from 2009 to 2013 are as per Figure 1.



Source: MFRS

Figure 1- Types of fire calls in percentage for period 2009-2013

Fires in sugar cane fields, grass, bush, tree, rubbish and forest account for nearly 80 per cent of all fire calls.

### 2.3.2 Special Services

The Special Services consists of emergency and non-emergency services. The emergency services include pumping of water during torrential rains, extrication of victims in road accidents, and rescue of people and animals. Non-emergency services include flushing of compounds, supply of water, and standby during certain events for governmental and non-governmental bodies and miscellaneous tasks. Most of the special services calls from 2009 to 2013 related to pumping, flushing and supply of water.

### 2.3.3 Fire Prevention Services

The MFRS carries out inspection of buildings, filling stations, fuel depots, gas installations and other fire hazardous premises throughout the island for the purpose of fire certification and licensing, in addition to conducting fire safety educational programmes for various categories of audiences. While conducting site inspections, officers consider the following:

- means to prevent a fire outbreak
- availability and adequacy of means of escape
- availability and maintenance of means to suppress/extinguish a fire
- availability and maintenance of means of giving warning in case of a fire
- access for firefighting and other emergency vehicles
- storage/handling of any hazardous material.

## **2.4 Organisation of MFRS**

In order to carry out the above services, the MFRS is organised in a hierarchical structure comprising grades of Chief Fire Officer, Deputy Chief Fire Officer, Assistant Chief Fire Officer, Divisional Officer, Senior Station Officer, Station Officer, Sub-Officer, and Fire fighter. The MFRS currently operates ten fire stations throughout the island which are grouped in three operational areas. There are also other units, each of which has the responsibility of a specific task described as follows:

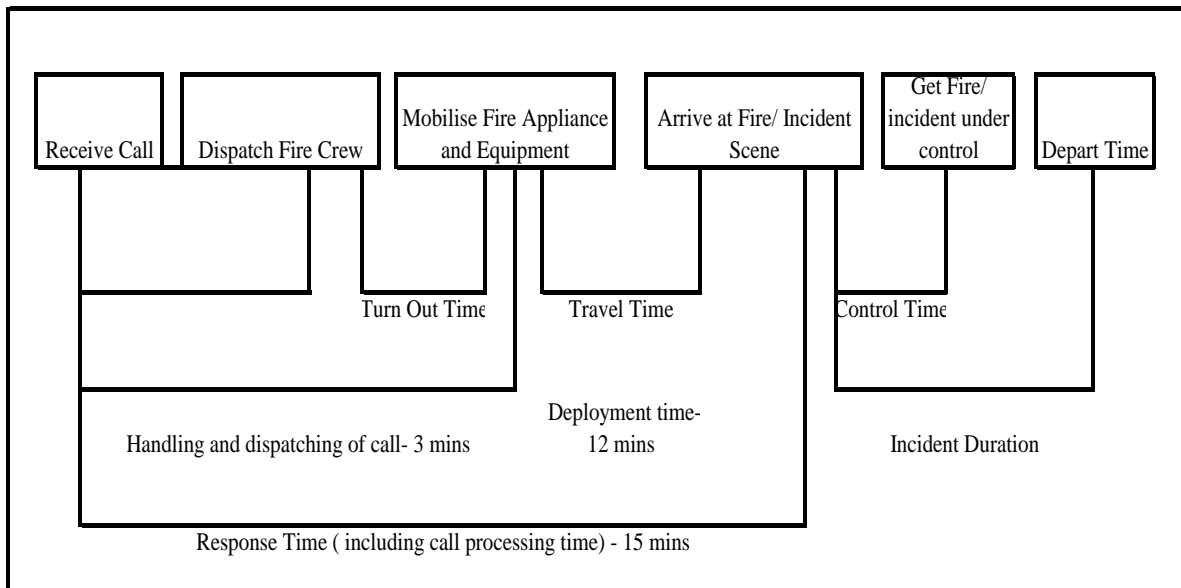
- *The Control and Mobilising Centre*, also known as the Control Room (CR), located at the MFRS headquarters, receives all the emergency calls, dispatch fire crews to incidents sites and monitors management of operations on the incident ground.
- *The Water Supplies Section* is located at MFRS headquarters and it is responsible for the coordination of all works carried out by Fire Stations in maintaining all sources of water supply. It ensures that fire hydrants are regularly maintained. It also keeps an updated status record of open water sources.
- *The Training Unit* is situated at Coromandel Fire Station. It provides training to officers of MFRS. It also provides training on fire safety to other officers and non- government organisations whenever there is a demand for.
- *The Mechanical Workshop* which is located at Coromandel Fire Station is responsible for the repairs and maintenance of all vehicles, plants and equipment of the MFRS.
- *The Fire Safety Division* delivers fire prevention services and details are as paragraph 2.6.

## **2.5 Description of the process how the MFRS attend to Fire and Special Services calls**

The Control Room (CR) is the nerve centre of the MFRS and provides essential communication link which enables the provision for fire fighting, rescue and other emergencies to the public when they call for the assistance through the Hotline **115**. The CR is in operation on a 24 hour basis and is staffed by one Officer in Charge (OiC) of the CR, one Senior Station Officer, one Station Officer and two Fire Fighters/Radio Operators. It is also supported by a Radio Workshop Team under the command of one Station Officer and two Fire Fighters assuming the duties of Radio Operators.

### 2.5.1 Call handling and Dispatching

The Hotline **115** comprise eight lines through which the CR gather important information from any caller such as: phone number, caller’s name and address, nature of incident to be attended, precise location, any casualty or trapped person and give advice if required. All the above information is recorded manually in Main Control Room Incident Information Card. The response time points and indicators of an emergency event for the MFRS are as per Figure 2.



Source: MFRS

Figure 2 Response Time points and Indicators of events

The call is then dispatched to the appropriate station. In each fire station, there is a Fire Fighter acting as duty man to receive all communications from the CR. If an emergency call is made directly to a fire station, the duty man gathers all the necessary information, conveys them to the CR and notifies the OiC of his station. To ensure that adequate resources are mobilised, the OiC of the CR dispatches the nearest available resource in accordance to the mobilising scheme. Senior officers are informed for necessary instructions and guidance. In case of fire in buildings, the CR informs Police Department, Central Electricity Board (CEB) and Central Water Authority of the incident. The Police is expected to attend in order to maintain order. CEB officers are expected to render the incident area safe from electrical hazards before any intervention by the MRFS. The CWA is expected to take appropriate measures to increase water supply and pressure in that area, in case the MFRS has to tap water from the fire hydrants.

During every intervention, the commanding office attending the incident has to communicate to the CR on the progress achieved. The CR records all the details and relay further instructions to MFRS team if needs be.



### **2.5.2 Response Times**

According to PBB of MFRS there are two response times: one for Call Handling/Dispatching Time (referred as P1) and the other for Travel Time (referred as P2).

The Response Time for P1 is three minutes for fire emergencies. This means that as soon as a P1 call is received, a First Team comprising of personnel, vehicle, plant and machinery and equipment is set up and is ready to proceed to the incident site.

The Response Time for P2 is 12 minutes and is for building/ structural fires only. This means that First Team should reach the incident site within a Travel Time of 12 minutes after mobilisation.

### **2.5.3 Mobilising Scheme**

The MFRS has a mobilising scheme for dispatching vehicles and equipment, accompanied by personnel depending on the type of incident. The First Attendance is the first team which will attend the incident. If more resources are required, then additional teams from neighbouring stations will be deployed to give assistance. Deployment of these resources is under the control of the CR. This Scheme ensures that a minimum level of response is effected within minimum time.

## **2.6 Activities of the Fire Safety Division**

The Fire Safety Division carries out inspections of buildings, filling stations, fuel depots, gas installations and other hazardous premises throughout the island for the purpose of fire certification and licensing. Fire safety educational programmes for various categories of audiences like primary and secondary schools and colleges, Government officers, employees of private enterprises, Non Government Organisations and vulnerable groups are also conducted.

The objectives of the Fire Safety Division are:

- To promote fire safety culture within communities through sensitization programme.
- To enforce fire safety statutory requirements.
- To review existing regulations and to upgrade fire safety guidelines.

Activities of the Fire Safety Division can be grouped under Certification and Licensing, Enforcement and Fire Safety Education.

### **2.6.1 Certification and Licensing**

Fire Safety responsibilities range from goodwill advice to complex inspections of new and existing buildings within the Commercial, Service and Industrial Sectors. A fire certificate was previously issued under Section 76 of the Occupational Safety and Health Act 2005. It is now issued under Section 19 of the Mauritius Fire and Rescue Service Act 2013. MFRS issues guidelines on the application procedure and criteria for the issue of Fire certificate and

Fire Clearance, Certificate of Registration for Storage of Liquefied Petroleum Gas (LPG) and renewal of Certificate of Registration for underground tanks, stores, spraying room under the Inflammable Liquids and Substances Regulations.

### ***2.6.2 Enforcement***

Enforcement of the existing Legislations and Regulations can significantly reduce fire incident and minimise property losses. Fire Prevention officers ensure, through inspections, that all violations with regards to fire safety measures in existing buildings are corrected and new buildings comply with all fire and life safety requirement prior to occupancy. They also ensure that building owners comply with fire safety requirements as per statutory requirements.

### ***2.6.3 Fire Safety Education***

Fire Safety Education is one of the key activities done by the Fire Safety Division. Dedicated staff support school programs, deliver fire and life safety programs designed to meet the special needs of population segments. The goal of the Fire Safety Education is to sensitise the population about the dangers of fire and the importance of cultivating a fire safety concept. Talks are delivered by trained officers of the MFRS in schools, community centres, youth centres, orphanages, old age homes and workplaces. The Division also conducts Fire Safety Awareness Campaigns to promote fire safety and emergency preparedness to the public free of charge.

## CHAPTER THREE

### FINDINGS AND ANALYSIS

This chapter presents our findings and analysis based on the questions set in the audit design to answer the audit objective.

#### 3.1 Challenges facing MFRS

For the past four years, MFRS spent on average some Rs 275 million per annum to achieve its main objectives of protecting the public from the threat of fire, accidents and other natural events.

MFRS has been operating in an environment that has constantly been changing over time. This poses new challenges to MFRS. The major challenges identified by MFRS are as follows:

- There will be a tighter economic climate for all public services, coupled with a need to deliver further improvements in efficiencies.
- The impact of the global economic slowdown and recession may lead to increased levels of arson and property fires.
- Closing social gap will continue to be a Government priority promoting more targeting of resources to those most vulnerable.
- New legislative provisions, namely in the Employment Relations Act 2008 and the Occupational Safety and Health Act 2005 , will require us to develop new approaches in our Human Resource Management strategies to ensure adequate manning levels of fire engines at all times.
- The increased frequency of adverse weather conditions means that we need to develop our resources to ensure that we continue to respond effectively to foreseeable events such as flooding.

These challenges are putting more pressure for the demand of services of MFRS. It has adopted a two-pronged approach namely: reactive through response to emergencies and proactive through prevention and emergency preparedness. However, the present focus of MFRS to put more emphasis on reactive approach to emergencies when they occur is not enough to meet those challenges.

An analysis of fire statistics indicates the followings:

- The number of fires and fire calls is increasing each year, from 5,785 in 2009 to 7,586 fire calls in 2013.
- The number of deaths caused by fire has remained at five deaths per annum.

- Sugar cane fires and bush fires calls have been increasing from 4,353 in 2009 to 6,300 calls in 2013. It accounts for nearly 80 percent of all fire calls.
- Fire calls from dwelling house increased from 212 in 2009 to 360 in 2013.
- The non fire calls (special services) have also increased from 1,834 in 2009 to 3,116 in 2013.

Despite the efforts of MFRS to reduce emergency incidents and protect citizens from loss of property and life there is still an increasing trend in fire statistics.

### **3.2 Implementation of Strategic plan 2010- 2015**

In 2009, MFRS developed its strategic plan for the period 2010 to 2015 with the following strategic goals:

- Reduce the number of fires, road traffic accidents and other emergency incidents
- Reduce severity of injuries in fires, road traffic accidents and other emergency incidents
- Reduce commercial, economic and social impact of fires and other emergency incidents
- Create a safer working environment for our fire fighters
- Safeguard the environment and heritage
- Provide a sustainable service that demonstrates quality and best value in service provision

It identified three priorities as follows:

Priority 1- Prevent loss of life and injuries from emergency incidents

Priority 2- Reduce the risk in our society

Priority 3- Respond promptly and effectively to emergency calls

It also identified the different strategies to achieve each priority.

Our analysis identified the following weaknesses in the strategic plan:

- *It was not backed by a comprehensive action plan and financing strategy.*

Action planning is the execution phase. It outlines a framework for implementing strategies and achieving objectives. However, MFRS did not develop any detailed action plan to execute its strategic plan. The absence of an actual plan comprising of activities/projects to be implemented on a yearly basis, the resources required, assignment of responsibilities, time frames for implementation of the different activities as well as their financing did not help MFRS in fully achieving its priorities.

➤ *The Strategic plan was not costed and prioritised.*

The strategies for each priority were not further developed into activities that could have been costed or prioritised. The plan identified what needed to be done but did not determine priorities for the implementation of the most important strategies. The absence of time frame and estimated costs of the different strategies did not help MFRS in effectively allocating its resources to its priorities.

As a result MFRS is experiencing difficulties in implementing its strategic plan and meeting its different strategic goals.

### **3.3 Integrated Risk Management Approach**

The mandate of the MFRS constitutes of diverse emergency services determined by events for which occurrence, frequency and impact are not predictable. This requires mobilisation of personnel, plant and equipment, and infrastructures on a 24 hour basis every day. In order to achieve this state of preparedness, there should be a mechanism that ensures a minimum number of trained personnel, fire fighting vehicles and equipment, and supporting infrastructure are available at all times.

International good practices (National Fire Prevention Association of USA, Fire and Rescue National Framework of United Kingdom) recommend the assessment of risks, taking preventive actions, and mobilising these resources in the right place at the right time. This helps to allocate resources for fire suppression and prevention more effectively and efficiently. One such mechanism is an Integrated Risk Management Plan which has been adopted by Fire Services in several countries.

MFRS has identified Integrated Risk Management Planning as one of its priority. Under the IRMP, MFRS plans to shift the focus to the risks arising from all fires and other emergency incidents, and the options for reducing and managing them.

In 2011, MFRS initiated the foundation steps towards the formulation of an IRMP, though without any targeted completion date. A risk profile in each of the fire stations based on the model of Central Scotland Fire and Rescue Service was carried out. However, this was not followed by a risk assessment exercise.

The formulation and implementation of an IRMP has financial implications as it calls for additional resources. This will require input of consultants in that field, for example for simulating models dealing with response to emergencies.

The call for additional resources was neither linked to a plan nor included in the budget. There was also no indication of the estimated cost of preparing such a plan that could have included project proposal with clear targets and resources requirements, financing issues and the merits of such a plan. This could have helped MFRS to secure necessary funds from Government.

In the absence of an IRMP, MFRS is deploying its resources according to its Mobilising Scheme. The Scheme stipulates the resources (equipment and personnel) which it should use taking into consideration risk categories.

*Response to emergencies:* MFRS has also set the call processing time to a maximum of three minutes and the total of turn out and travel time in case of a building/ structural fire to be twelve minutes. For the period 2010 to 2012, MFRS has not been able to fully achieve its targets as shown in Table 1.

*Table 1 Target compared to Actual results*

	2010		2011		2012	
	Target %	Actual %	Target %	Actual %	Target %	Actual %
P1 (Call handling)	90	89	95	92	95	93
P2 (travel time)	80	66	85	79	85	63

*Source : Accountant General Reports*

Some examples of non-compliance to P2 are given in Appendix I.

There are no standards for other types of fire and emergency incidents, such as road traffic accidents and chemical spills, which form part of the Fire and Rescue Services. This system of fire cover concentrates on emergency response when the problem has occurred with no reference to any preventative measures.

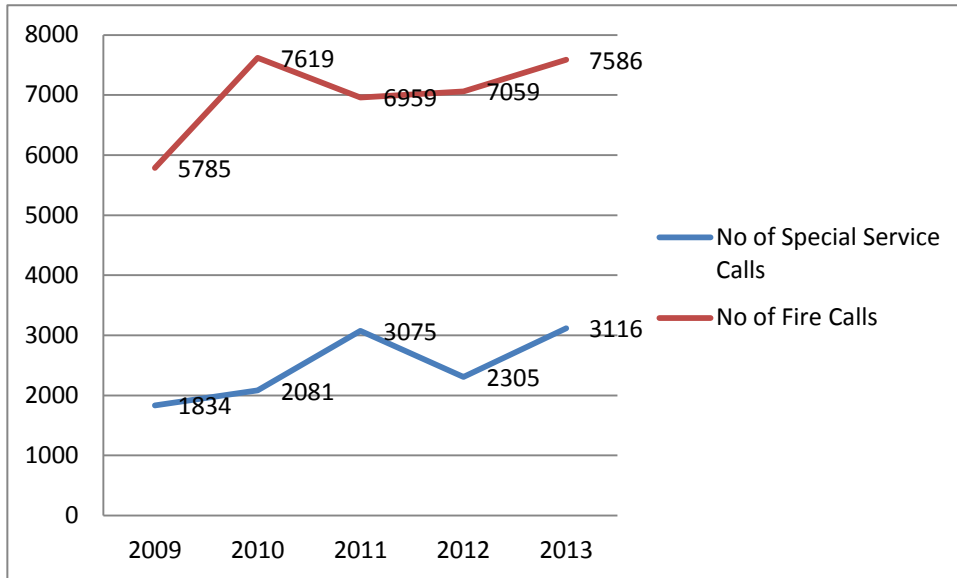
### **3.4 Allocation of resources to non-core activities**

The Special Services consists of emergency and non-emergency services. The emergency services include pumping of water during torrential rains, extrication of victims in road accidents and rescue of animals. Non- emergency services include flushing of compounds, supply of water, and emergency cover during certain events for governmental and non-governmental bodies.

Provisions of these diverse emergency services on a 24 hour basis require the mobilisation of resources on emergency cover in all the ten fire stations. As most of the demand for services cannot be predicted in advance, the amount and type of resources to be made available cannot be determined precisely. Consequently, MFRS mobilise almost the same amount and type of available resources on a 24 hour basis. These resources are also used to provide non-emergency services.

Over time MFRS has gradually moved from attending exclusively fire calls to non-fire calls (known as Special Services) and other services.

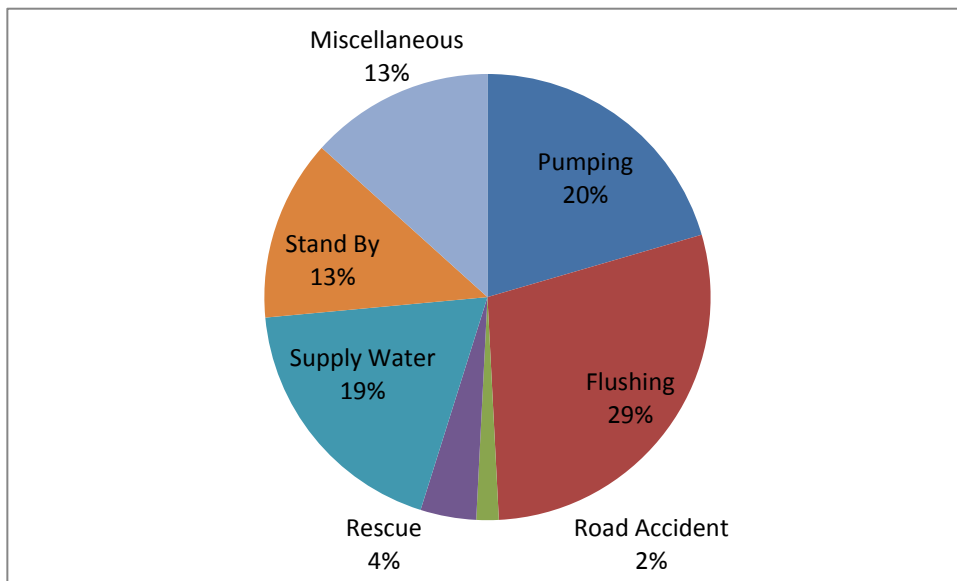
The number of special service calls and fire call has been increasing over the years as shown in Figure 3.



Source: MFRS

Figure 3 Number of calls during period 2009-2013

For the period 2009-2013, the MFRS received calls for special services which has been analysed as per Figure 4.



Source: MFRS

Figure 4 - Analysis of Special Services for period 2009-2013

Special services was further analysed into number and types of calls for the period 2009 to 2013. The results are shown in Table 2.

Table 2- Analysis of Special Services for period 2009-2013

	<b>Number of calls</b>	<b>Percentage of number of calls</b>	<b>Average Percentage effected</b>
<b><i>Emergencies</i></b>			
Pumping	2,535	20.5	40
Road Accident	200	1.6	58
Rescue	500	4.0	73
<b><i>Subtotal</i></b>	<b>3,235</b>	<b>26.2</b>	
<b><i>Non emergencies</i></b>			
Supply of Water	2,312	19	95
Flushing	3,550	29	95
Stand by	1,625	13.1	98
Miscellaneous	1,649	13.3	83
<b><i>Subtotal</i></b>	<b>9,136</b>	<b>73.8</b>	
<b>Total</b>	<b>12,371</b>	<b>100</b>	

Source: MFRS

Special services include both emergencies and non emergencies. 74 percent of the calls related to non emergencies and 26 percent to emergencies. Although MFRS could not attend all the emergencies it attended almost all the non emergency calls.

Emergency Calls relating to pumping of storm water accounts for one fifth of all Special Service Calls. However pumping services were provided on average in 40 percent of cases. One of the reasons was that during rainy periods MFRS received multiple requests that could not be attended with available resources. Priority was given to life threatening incidents. This has been frequently reported in media to be a major issue of dissatisfaction for service users.

Provision of non-emergency services free of charge to certain institutions consumes resources which instead could be focused on its core activities. In cases where the fees for non-emergency services are paid by private parties, the fees received are low when compared to the resources deployed by the MFRS.

### **3.5 Resources currently allocated across the ten Fire Stations of the MFRS**

Vehicle, machinery and equipment are allocated to the ten Fire Stations in relation to types and number of calls received and risk profile of station area. MFRS has a Mobilising Scheme for dispatching vehicles and equipment, accompanied by personnel in function of the type of



incident. The First Attendance is the first team which will attend the incident. If more resources are required, then additional teams from neighbouring stations will be deployed to give assistance.

An analysis of the distribution of these resources was carried out and the findings are as follows:

### ***3.5.1 Distribution of vehicles and equipment***

Fire Stations with fewer resources are affected mostly once there is a shortage of vehicles especially when vehicles and equipment are grounded during long periods in workshop for repairs and maintenance.

In some circumstances, there was no backup when each fire station was attending calls in their respective station area. This caused delays in attending and providing support to other calls received in the same time frame within each station area. As vehicles and equipment were not readily available, support was provided by other fire stations, but with delays. This has an adverse impact on service delivery.

Fire progresses more rapidly with time; therefore the more fire fighters arrive late on site of fire, the higher is the potential for damages.

### ***3.5.2 Availability of appropriate and adequate vehicles & equipment***

Vehicles and equipment are expensive. Mobile resources need to be appropriate, adequate, and reliable to be deployed for fire rescue at any time. This requires asset management practices that include planning, acquisition, operation, maintenance and disposal, with clearly defined control, accountability and reporting requirements.

At time of audit, MFRS owned different types fire fighting vehicles in running condition with the following age profile as shown in Appendix II.

Average life span of a MFRS fire fighting vehicle is in the range of 10 to 12 years. Currently, 48 per cent of the fire fighting vehicles and 40 per cent of the double cabs are over 12 years.

The relatively low life span is due to the following factors:

- Specialised fire fighting vehicles are used in extreme conditions. This contributes in decreasing significantly their lifetimes compared to non-specialised types.
- Vehicles are used on uneven roads. 75 percent of the incidents attended during the period examined were off the road.
- Road conditions, braking, speed and weight of vehicle lead to a heavy wear and tear on body, chassis and engine.
- Once the built-in pump on the vehicle is beyond economical repairs, the vehicle becomes practically useless.

To increase its operational capability, the MFRS proposed investment of some Rs 165 million in vehicles and equipment over the years 2012 to 2015. However, in the Budget Estimates of 2013-2015, no fund was earmarked for fire fighting vehicles whereas a sum of Rs 20 million was earmarked for acquisition of fire fighting equipment only. Consequently, a renewal policy could not be implemented for fire fighting vehicles due to unavailability of funds. Instead, replacements were effected as and when required based on availability of funds.

As a vehicle grows older, it requires increased repairs and maintenance to remain in a serviceable condition. To operate an ageing fleet, in the absence of an effective renewal plan, timely maintenance and repairs are required to operate vehicles beyond their normal life span. However, in the case of MFRS, the in-house workshop was unable to provide such timely services. The main reasons identified by MFRS are as follows:

- Problems associated with workshop layout leading to working space constraints.
- The procurement of spare parts for maintenance and repairs is not timely.
- Mechanics are not on call during weekend and public holidays. In case of emergency, mechanics are contacted on a voluntary basis and when they are not available, the situation turns critical. The in-house stores for spare parts are also closed during weekends and public holidays.
- The mechanics of the FSMW have been trained in maintenance of conventional vehicles and pumps.

Consequently, there was a backlog on repairs and maintenance of vehicles and equipment which reduced the availability of these resources at various fire stations

## **3.6 Sugar Cane field, grass and bush/tree/rubbish fires**

### ***3.6.1 Sugar Cane Field Fires***

One of the challenges facing MFRS is fighting sugar cane field, grass and bush fires. It was explained that these produce intense fires that travel quickly in addition to producing several pockets of fires in advance of the main zone. This requires quick response time, four wheel drive vehicles and sufficient number of personnel and equipment.

An analysis of fire statistics indicated that calls for sugar cane fields for the period 2009 to 2013 has increased from 2,212 calls in the year 2009 to 2,254 in the year 2013. It accounted for an average of 30 per cent of all calls over this period.

### ***3.6.2 Grass/ bush/ rubbish and Forest fires***

This type of fire calls has also been increasing from 2,141 in year 2009 to 4,043 calls in 2013, an increase of almost 90 percent.

Sugar Cane field fires and grass/bush/rubbish/forest calls account for some 80 percent of all fire calls as shown in Table 3. There is no code enforcement for such type of fires.

*Table 3 Sugar Cane field/grass/bush/rubbish and forest fire calls as a percentage of all fire calls*

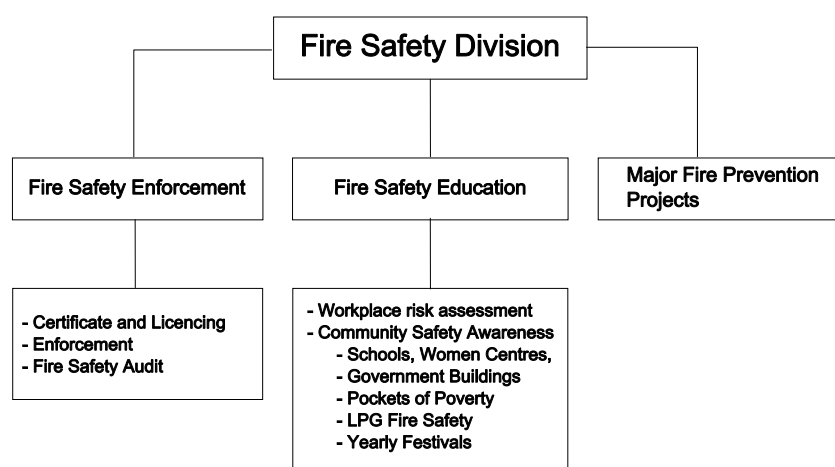
	2009	2010	2011	2012	2013
Total Fire Calls	5,785	7,619	6,959	7,059	7,586
Total Sugar Cane Field fires and Grass fires	4,353	6,069	5,404	5,535	6,297
% of total fire calls	75.2	79.7	77.7	78.4	83.01

Source: MFRS

The trend over this period indicates that the MFRS needs to be more effective in limiting the extent of damage to sugar cane field fires and grass/bush and forest fires.

### 3.7 Fire Prevention Activities

The Fire Safety Division undertakes several activities like Fire Safety Enforcement, Fire Safety Education and Community Fire Safety Programmes as shown in Figure 5.



*Figure 5- Organisation of the Fire Safety Division*

### ***3.7.1 Absence of post certification inspections***

Previously, under section 76 of OSHA 2005, now under section 19 of Mauritius Fire and Rescue Service Act 2013, MFRS is required to issue a fire certificate in respect of any place of work that meet certain conditions laid thereof. Non compliance to these conditions empowers MFRS to revoke the fire certificate. The purpose of the certificate is to ensure that there are adequate safeguards to prevent and protect loss of life, property and environment against any fire incident.

Once a Fire Certificate is issued to the owner of a building, MFRS does not carry out regular post certification inspections to ensure that the owners are complying with the conditions of the certificate. This is only done for cases where there is demand for extension of activities or extension of premises by the owner.

The issuance of Fire Certificate only is not enough to ensure adequate safeguard against fire outbreak. Regular post certification inspections to place of work that are at risk could contribute to reduce number of fire incidents and subsequently reduce the cost of deploying MFRS costly resources to attend the fire incidents and limit loss of life and property in case of fires.

In other countries such as UK, Singapore and Greece, it is regular practice to carry out post certification inspections. This has contributed to reduce the number of fire incidents.

### ***3.7.2 Enforcement of Fire Prevention Regulations – Other than Fire Certificate***

The Fire Safety Division is required to conduct regular inspections, tests and maintenance of fire precautionary measures, especially in buildings where public has access, to ensure they remain effective so as to enforce all matters relating to fire safety in accordance with provisions of the statutory legislation as per specifications of the Schedule One and the requirements of Schedule Two of OSHA 2005 and section 7(5) of MFRS Act. This is done as follows:

- Post incident fire inspections to provide sufficient information which eventually can support in reducing the risk of incident caused by fire.
- Inspection of night clubs, cinemas, hotels and other premises whereby compelling those places to comply with fire safety measures.
- Inspection of Government premises to ensure at least basic fire safety precautions is observed.
- Inspection of bulk depot prior to the renewal of Certificate of Registration.

The inspections of building for issue of certificate and bulk depot for issue of certificate of registration are regularly carried out by MFRS.

Fire Safety Division has the responsibility to continually evaluate the adequacy of their methods and procedures and the adequacy of the fire guidelines and regulations. However it does not carry out post certification inspections to identify non compliance with the conditions imposed in the fire certificate.

For the period 2010 to 2011, no inspection of night clubs, cinema hotels and other premises were carried out. From 2012 onwards it started carrying out inspections.

Areas of improvements in work procedures and/or in the implementation of fire guidelines and regulations may not be identified.

### **3.7.3 Limited Fire Safety Education**

Fire safety education is aimed at reducing the negative attitude towards fire disaster. Sensitisation programmes are carried out to educate the population about all aspects of fire prevention and how to deal with it to minimise loss of property and life. Fire Safety Education is also carried out to sensitise the population about the dangers of fire and the importance of cultivating a fire safety concept.

The MFRS through its Fire Safety Division carries out a number of activities such as fire safety education at school and colleges, talks and lectures at Government premises, non-government premises and social welfare centres. It also runs awareness programs on the local media during festive periods to make the population aware of dangers and the precautions that need to be taken to prevent and protect against fire incidents.

The actual results of talks and lectures for the past three years are as shown in Table 4.

*Table 4 - Actual results of lectures and talks*

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<b>Year</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Number of talks and lectures delivered by Fire Safety Division and Fire Stations	203	324	420

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*Source: MFRS*

It is not a planned activity that targets the most vulnerable group to fire incidents. The number of talks and lectures delivered was mostly linked to the requests received at the MFRS. It was not linked to the risk profile of the targeted group. During the years 2011 and 2012, schools and colleges were invited to make request to the MFRS to conduct talks. The response to conduct talks was very low.

MFRS also does not measure the outcomes of fire safety education activities for example:

- Changes in participants' safety knowledge, attitudes and beliefs
- Observed and documented changes in behaviour (e.g. safe storage of flammables, planned and practiced escape plans) and safety devices used(e.g. smoke detectors)

Resources were allocated to carry our fire safety education activities without ensuring value for money.

## CHAPTER FOUR

### CONCLUSION

MFRS is providing cover for mitigation of fire, emergency rescue and natural disasters. Good practices require that resources are allocated on the basis of long term plan or strategic plan which puts risks and service level in focus. Even though MFRS has a strategic plan, it is experiencing difficulties in implementing it. The development of a plan is not an end in itself. Capacity and actual implementation of plans are also fundamental for the realisation of its objectives. Owing to weaknesses in the plan, particularly in terms of resources and prioritisation, the goal of protecting the public from the threat of fire, accidents and other natural events could not be fully achieved.

MFRS is operating in an environment that is constantly changing. This poses new challenges to MFRS. It has recognised the importance of an IRMP as an effective tool in meeting these new challenges. Although MFRS did a risk profile exercise in its different stations there has not been any further progress towards developing an IRMP.

There has been the gradual involvement of the MFRS in providing diverse services required by various legislations to that of its main Act. The core activity of the MFRS is to attend different types of emergencies. Yet with its limited resources, MFRS used some of its costly resources to attend non emergencies.

MFRS had to intervene frequently to attend sugar cane field and grass/bush/tree fires which have been increasing over the years. Although significant percentage of the total calls relates to these fires, MFRS has been experiencing difficulties in preventing these fires and containing the damage caused.

Generally, preventing fire is more cost effective than fire fighting including cost of damages to property and lives. MFRS is not following the worldwide trend of reallocating more resources to fire prevention rather than fire suppression. The current approach adopted by MFRS puts more emphasis on fire suppression than fire prevention. These fire prevention activities were limited to issue of fire certificate and lectures.

MFRS conducts site inspections before issue of certificate to make businesses comply with fire regulations, issue of fire safety guidelines and sensitisation campaign. Yet more needs to be done to reverse the increasing trend on fire calls. Some of these actions may be in the form of regular site visits after issue of certificate, more lectures on fire safety to targeted groups, help building owners to identify weaknesses in fire safety system and organisation of fire safety weeks and related activities where members of public can participate and learn about fire safety to build a culture of fire safety consciousness.

## CHAPTER FIVE

### RECOMMENDATIONS

#### 5.1 Implementation of strategic plan

A strategic plan should aim to help any organisation to achieve its mission. It should be realistic and achievable and should include specific activities that need to be undertaken to support the objectives and strategies. MFRS should, based on lessons learnt from the past, prepare detailed implementation plans which should include, amongst others, activities to be undertaken, objectives of the activities, tasks to be performed, people assigned, milestones and deliverables on a short term, medium term and long term basis. It must ensure that the detailed implementation plans are prepared and implemented as this will show the full support and commitment of MFRS in achieving its vision, goals, short term and long term objectives. The activities should be costed, time framed and prioritised. A strategic plan which is not supported by detailed implementation plan is prone to be unachievable and tantamount to failure.

#### 5.2 Producing an Integrated Risk Management Plan

Worldwide, there are growing concerns about how to manage risks and respond to fire and non-fire emergencies. In an environment characterized by resource constraints and increase pressure for the services of MFRS along with an increasing trend in fire statistics, there is a need for efficient and effective planning to ensure acceptable level of service delivery to improve community safety and make more efficient use of resources available. In this situation, it is now more evident and urgent for MFRS to have its IRMP. Experiences of Fire and Rescue Authorities of other countries, e.g. Scotland and UK that have produced and implemented an IRMP have shown significant improvements in their prevention, protection and response services they attended. MFRS may consider the formulation of a roadmap, detailing the activities involved in preparing an IRMP with clear targets, how to raise funds, expertise and administrative support for this IRMP. MFRS can also prepare a synopsis of the importance of IRMP and make preliminary demand for necessary funding from MoFED.

#### 5.3 Focusing on core activity

The MFRS needs to focus on its core activities and consider conferring services like flushing and supply of water to local authorities. Recommendations can be made to the Parent Ministry to request Local Authorities to accommodate the non-emergency needs of non-governmental organisations under their social welfare activities using less costly plant and machinery.

#### 5.4 Availability of Vehicle and Equipment

When vehicles are grounded at the workshop for a long time, this has an impact on the service provided. It is therefore recommended that when vehicles are sent for repairs to the

workshop, they are repaired at the earliest convenience. If repairs are to be carried out for a longer time for reasons outside the control of MFRS, other arrangements need to be made so that fire stations are not deprived of vehicle.

### **5.5 Sugar Cane field and grass and bush/forest fires**

MFRS alone may not be able to reduce the occurrence of these types of fires. There is a need for a cost effective approach that tackles the problem before fire starts. The emphasis must be on the prevention of fire, rather than on using costly methods of dealing with fire after it has started. This can be done by working in collaboration with owners of sugar cane fields and other land owners. This collaborative approach which can be included in the IRMP may be done as follows:

- Working on sugar cane fire regulations that will make owners responsible for fire safety measures to reduce the risks of fire occurrence.
- Working on fire breaks that will limit the progression of fires and damages caused.
- To develop other preventive measures that will deter cane fires e.g. patrolling.
- Code of practice be developed in consultation with Irrigation Authority, Mauritius Cane Industry Authority, Sugar Insurance Fund Board, Mauritius Sugar Planters Association, Small and Medium Planters Association, Forestry Division and local authorities to reduce incidence of such fires.

### **5.6 Fire Prevention Activities**

- In order to ensure that building owners are complying with the fire safety guidelines and fire safety requirements are maintained at all times, post certification inspections need to be done at regular intervals. In case of non- compliance MFRS should initiate procedures for legal action.
- To ensure prompt action against building owners in case of default, proper records like exact name of building, address and certificate number if any need to be kept and this should be easily traced after attending any fire. All data and information should be kept up to date.
- Regular enforcement inspections need to be carried out at high risk places like night clubs, cinemas and hotels in order make everyone comply with the law. Based on information collected during visits, proper advice and support should be given to employees and owners of building to make them more fire safety conscious.
- It is recommended that a fire risk assessment of workplaces be carried out and follow up action be undertaken to keep the workplace a safe place to work. Furthermore sensitisation needs to be concentrated on high risk workplace rather than effecting lecture based on demand only.
- Aggressive fire safety and emergency preparedness community outreach programmes should be planned and carried out on a regular basis.



**Examples of Non-compliance to P2**

SN	Date	Time of Call	Time Taken to allocate resources to site (Hrs:mins)	Time Taken to Travel to site	Time interval between notification of fire and resources arriving on site (Hours:min)	Station	Location of Fire	Nature
1	18.01.12	10.55	0:01	0:30	<b>0:31</b>	Mahebourg	Grand Sable	House Fire
2	19.01.12	11.23	0:01	0:31	<b>0:32</b>	Mahebourg	Vieux Grand Port	Church Fire
3	23.01.12	13.56	0:01	0:52	<b>0:53</b>	St Aubin	La Gaulette	House Fire
4	19.05.12	19.46	0:01	0:20	<b>0:21</b>	Curepipe	Vuillemin, Quartier Militaire	House Fire
5	14.08.12	11.18	0:01	0:36	<b>0:37</b>	Port Louis	Cite Martial	House Fire
6	22.08.12	13.36	0:03	0:20	<b>0:23</b>	Curepipe	Glen Park, Vacoas	House Fire
7	27.08.13	17.59	0:02	0:22	<b>0:24</b>	Quatre Bornes	Flic en Flac	Kiosks/ Toilet
8	11.09.13	13.53	0:02	0:20	<b>0:22</b>	Quatre Bornes	Sodnac	House Fire
9	6.11.13	17.21	0:01	0:38	<b>0:39</b>	St Aubin	Riviere des Galets	House Fire
10	12.11.13	12.11	0:01	0:21	<b>0:22</b>	Flacq	Camp de Masque	House Fire
11	17.11.13	19.45	0:01	0:44	<b>0:45</b>	Curepipe	Rose Belle	House Fire

**Age Profile of Vehicles**

	Vehicle	No	Age analysis			Use of Vehicles
			< 5 years	≥5 years but < 12 years	≥12 years	
1	Mobile Pump	16	5	5	6	First Strike vehicle (main fire fighting unit carrying a crew of 4 fire fighters, with water tank, water pump, breathing apparatus, ladders, hose reels)
2	Water Lorry	7	-	-	7	Support vehicle providing water.
3	Rapid Intervention Vehicle	4	-	-	4	Support Vehicle
4	Major water Tender	2	-	1	1	Bulk Water supplies, water pump and a crew of 2 fire fighters)
5	Multi media	1	-	1	-	Actually used as a water carrier – Depleted of other fighting equipment/ agents
6	Fire Fighting Double Cab	33	6	14	13	