REPUBLIC OF MAURITIUS

NATIONAL AUDIT OFFICE

PERFORMANCE AUDIT REPORT

MAINTENANCE OF GOVERNMENT PRIMARY AND SECONDARY SCHOOL BUILDINGS

Ministry of Education and Human Resources, Tertiary Education and Scientific Research

July 2015

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ABBREVIATIONS

DC	District Contractors
GS	Government School (Primary)
IMU	Infrastructure Management Unit
IoW	Inspector of Works
MEHR	Ministry of Education, Human Resources, Tertiary Education and Science
MPI	Ministry of Public Infrastructure, Land Transport and Shipping
MU	(Zone) Maintenance Unit
NAO	National Audit Office
PPA	Public Procurement Act
PPO	Procurement Policy Office
PTA	Parent Teacher Association
SSS	State Secondary School
TO	Technical Officer
WO	Work Order

EXECUTIVE SUMMARY

In line with the Ministry of Education, Human Resources, Tertiary Education and Science (MEHR) objective to achieve a quality education for all, it is imperative that the quality of learning environment and infrastructure be of a good standard in educational institutions.

The Ministry incurred some Rs 300 million on maintenance of School Buildings during the period 2012 to 2014.

Reports from the Ministry of Public Infrastructure, Land Transport and Shipping (MPI), indicated that defects identified in a few School Buildings were attributable to lack of maintenance after construction stage, among others. The National Audit Office (NAO), in a previous Performance Audit, also, found that repairs and maintenance of School buildings were carried out as and when required. The lack of proper maintenance in Schools is a major issue as:

- value for the money invested in constructions is not being obtained,
- the benefits of the buildings are not being reaped over the entire duration of their lives, and
- inconvenience to the School community is caused.

It is against this background that the NAO carried out this Performance Audit to assess whether the MEHR has an appropriate system to maintain its School buildings in a usable condition. Processes and practices run and operated by the Zones' Maintenance Units (MU), Infrastructure Management Unit (IMU) and the MPI were examined. The audit focussed on building infrastructures. Mechanical and electrical systems, equipment, furniture and grounds were excluded.

Key Findings and Conclusions

- The Ministry does not have a proper maintenance strategy. Maintenance carried out was mainly corrective, with little emphasis on preventive maintenance.
- There were backlogs on both major and minor maintenance works. These were mainly attributed to delay in the appointment of District Contractors (DCs), inadequate planning and monitoring on the implementation of the works.
- Financial resources available in recent years were not fully used. Substantial funds were unspent at year end and lapsed. Yet, more than 50 per cent of prioritized works in both Zones 1 and 2 were still outstanding at year end.
- Maintenance works were not adequately monitored. There was insufficient supervision on jobs examined. This affected the delivery to time, cost and quality. No annual plans were drawn to implement works. Progress of work was not adequately monitored by IMU and Zone MU.

- Substantial grants were paid to Schools Parent Teacher Associations (PTA) and Zone Directorates approved maintenance projects funded by same. However, a system for their supervision at Ministry's level to ensure that these jobs meet a minimum standard was not in place.

- The Ministry is not doing enough to make an optimum use of its available labour resources for maintenance activities. No benefits were derived from part of labour hours paid for at Zone level.

- For IMU and MPI works, proper agreements were drawn with Contractors. However, compliance with standards and specifications for works, appropriate level of workmanship, and, thereby, quality of works were not sufficiently ensured through an adequate level of supervision on most jobs examined. Insufficient documentation during the execution phase of some of IMU and MPI works was a recurrent feature.

- The procurement system for materials, works and services is well established, followed and that allowed resources to be acquired at the least cost by the Ministry. The late or non-appointment of MPI's DCs, in recent years, had a negative effect. Priority jobs could not be carried out and available funds for these jobs could not be spent and lapsed.

- Guarantee Certificates for waterproofing works examined did not comply with contractual requirements. Repairs to defects by Contractors, within the guarantee period, were not prompt and complete. Several Schools experienced continued leakages that affected the smooth running of classes during the warranty periods. Conditions for the guarantee to stand were not met by Schools and this caused the warranties to lapse. Benefits of the warranties were not effectively derived. Costly new waterproofing works had to be undertaken anew at some Schools.

Key Recommendations

The following are recommended:

- *Preventive Maintenance*

  The Ministry should move towards preventive maintenance by using existing labour resources. Checklists for all areas of a building to be inspected should be developed and personnel of Zones' Maintenance Unit should be trained to carry out inspections.

- *Budgeting*

  The Ministry, IMU and Zone Directorates should ensure that maximum use is made of voted provisions through proper planning and monitoring. Zone Directorates should monitor their budgetary allocations through updated financial status reports at each Infrastructure Committee Meeting. This will help to ensure funds are available on time for all prioritised jobs through appropriate requests for reallocations.

Maintenance Works Programme and Monitoring of Works

The Ministry should ensure that Zone Directorates submit their Implementation Programmes/Plans and Quarterly Progress reports for the prioritised works. The plans should set time frames and define resource needs for each project. Quarterly progress reports should reflect the status of execution of the works in relation to time, cost and quality. Quarterly meetings between IMU and each Zone should be held to monitor and follow up projects. Constraints and/or deviations from plans should be identified and addressed promptly.

- *Maintenance Unit (Zone Level)*

  - Proper plans that allow for monitoring and measurement of performance should be drawn. Any variance between actual time taken (worked out from Job Sheets) and preset time on plan should be investigated.

  - Monitoring and supervision of works should be adequately carried out so that tasks are fully completed to time, at reasonable cost and be of acceptable quality.

  - The Ministry should monitor the implementation of the plan to ensure maximum use of available man hours. It may also consider having recourse to "Task Work", as described in the Pay Research Bureau (PRB) Report.

  - A system to monitor the quality of works undertaken by PTAs should be set up**.**

- *IMU and MPI Works*

  IMU and MPI should ensure that works are executed as per requirements of the contract. This can be done through effective monitoring and supervision, and adequate contract management. During the execution phase, the good practice, to have proper documentation (including timely filing) on all works carried out, should be adopted.

- *Guarantee Certificate*

  MPI should consider drafting an adequate and enforceable Guarantee Certificate with proper wording, setting the responsibilities and liabilities of parties involved, to be included in contracts drawn with its selected DCs. Pending this arrangement, MPI should report DCs, whose waterproofing Sub-Contractors failed to attend promptly and completely to repairs under warranty, to the Procurement Policy Office for necessary action.

  MPI should seek legal advice on the validity of guarantees already submitted.

CHAPTER ONE

INTRODUCTION

1.1 Background

School buildings are considered one of the most important assets of the Ministry of Education, Human Resources, Tertiary Education and Science (MEHR), and it is important that they are properly maintained. Over the years, the Ministry has invested significantly in the maintenance of these buildings. Good practices on assets management involve the planning, acquisition, maintenance and disposal of assets with due regard to economy, efficiency and effectiveness, as well as full compliance with all applicable Government regulations. In the Performance Audit at the MEHR carried out in 2009, the different aspects on planning and construction of School buildings[1] were examined. This Report examined the system on the "Maintenance of Government Primary and Secondary School Buildings".

1.2 Motivation

Every year, maintenance of Schools costs the Ministry some Rs 100 million.

Reports, from the Ministry of Public Infrastructure, Land Transport and Shipping (MPI), identified defects in a few School Buildings. These were attributed to inadequacies during construction stage and lack of maintenance thereafter. In the previous Performance Audit Report, mention was made that repairs and maintenance of School buildings were carried out as and when required.

It is against this background that the National Audit Office (NAO) carried out this Performance Audit on the "Maintenance of Government Primary and Secondary School Buildings".

1.3 Audit Objective

The objective of the audit was to assess whether the MEHR has an appropriate system to maintain its School buildings in a usable condition.

1.4 Audit Scope

This Report focussed on the maintenance activities at Secondary and Primary School Buildings in Mauritius. The processes and practices, relating to planning, execution, monitoring and supervision of maintenance works, were examined. Maintenance of mechanical and electrical systems, equipment, furniture and grounds was excluded.

[1] The Performance Audit Report, "Efficiency and Effectiveness of the School Building Programme" was issued in 2010.

The period under review covered the years 2012 to 2014, and status of selected projects examined were followed up to April 2015.

1.5 Audit Design

The main audit question was based on the requirement to carry out timely maintenance at least cost and of reasonable quality. Four sub-questions examined issues relating to maintenance strategy, planning and prioritisation, procurement practices, resource utilisation, monitoring and supervision of works, and contract management. The questions developed are shown in Figure 1.

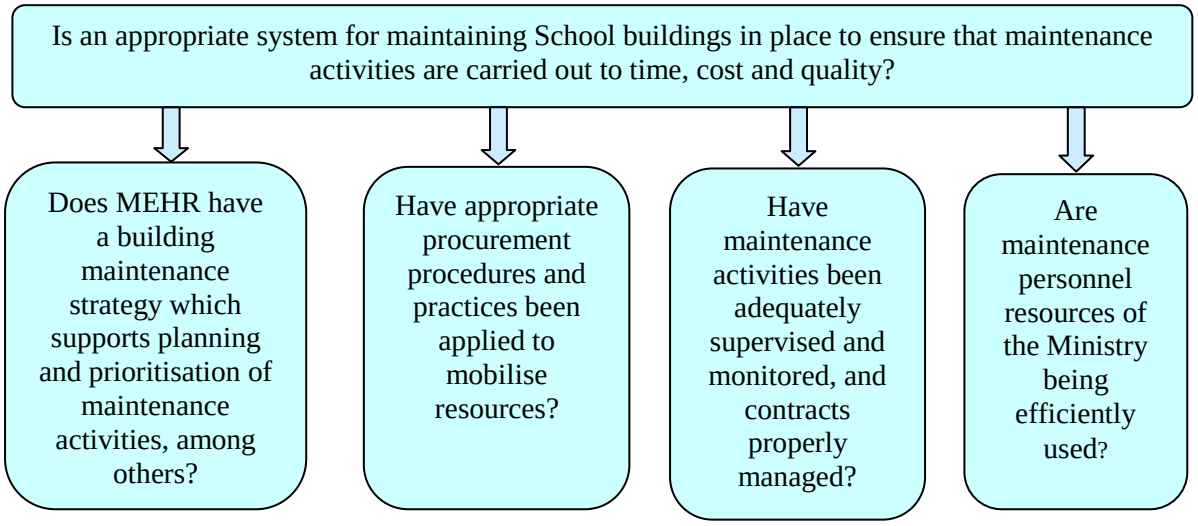

Figure 1: Audit Questions

1.6 Audit Methodology

The audit work was conducted in accordance with the International Standards for Supreme Audit Institutions (ISSAI). The audit team collected data through document reviews, interviews and inspections. During site visits, the team was accompanied by technical staff who explained technical aspects of works executed. The team reviewed documents for information about the strategies, programmes, systems, procedures, and funds spent on the maintenance of School building infrastructures, and interviewed key personnel of the MEHR, Zones and its Units responsible for maintenance, such as the Infrastructure Management Unit (IMU) and Zone Maintenance Units (MU). It also discussed with key staff of the Civil Engineering Section of the MPI which carries out maintenance, repairs and rehabilitation of all Government buildings.

Non-statistical sampling was used in the choice of two out of four Zones, and Schools within the selected Zones.

1.6.1 Choice of Two Zones

All four Zones have similar organisational structures and carry alike maintenance activities. Similarities in operation, funding arrangement and maintenance personnel also exist. Differences centre on number, age, type of construction and type of Schools, student population and physical environment. More than 50 per cent of the Ministry's maintenance budget is consumed by IMU and MPI driven works. The balance is shared among the Zones on the basis of priorities set for each Zone. Zone 1 has largest number of Schools, and average annual maintenance expenditure. Zone 2 ranks second under these criteria. Based on the above, Zones 1 and 2 were chosen.

1.6.2 Choice of Schools within Zones 1 and 2

Schools have different characteristics that influence the demand for maintenance activities to be carried out thereat. Criteria taken into consideration for the selection of Schools were geographical location, climatic condition, type and age of buildings, maintenance cost and School population. 14 Schools in Zone 1 and 12 in Zone 2 were selected; including Schools where execution of maintenance projects was ongoing.

1.7 Assessment Criteria

To assess the School building maintenance system, criteria were drawn from various sources such as:

- *Legislation* - Public Procurement Act
- *Government Guidelines and Procedures* - These regulate administrative operations within the Ministry and interaction with other Government bodies
- *Contract Documents* - These included the Procurement Policy Office (PPO) and FIDIC General Conditions of Contract
- *Government of Mauritius Standard Specifications issued by MPI* - These state the minimum standards to be observed for materials used and workmanship during execution of the works. At each step during execution, clear technical requirements are also specified. A summary of the specifications pertaining to important maintenance works covered in this Report is given in the Appendix.
- *Pay Research Bureau Reports* - The Reports detail the conditions of service and salary structure for Public Officers

Generally accepted maintenance management practices[2] were also used as guidance. These include

[2] A number of literatures on maintenance contain almost similar practices. The main documents consulted were: *Guidelines for Physical Asset Management* issued in 2006 by the then Management Audit Bureau (now Office of Public Sector Governance) and *Maintenance Management Framework*, Queensland Government, Australia.

- preparation of a maintenance strategy, incorporating a balance of planned maintenance (preventive and corrective) and unplanned maintenance (reactive and emergency),

- establishment of a periodic review and record of conditions of buildings,

- formulation of a strategic maintenance plan that reflects maintenance needs over the immediate, medium and long terms,

- production of an annual maintenance works programme based on condition assessments, and

- formulation of a budget based on a realistic calculation of the level of funding needed to maintain buildings.

Other details on assessment criteria used are in the relevant Sections of the Report.

1.8 Data Validation Process

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

CHAPTER TWO

DESCRIPTION OF THE AUDITED ACTIVITY

This Chapter provides background information and description of the system for maintaining Government School buildings.

2.1 Maintenance

British Standard 8210 defines "maintenance" as the combination of all technical and administrative actions intended to retain an item in, or restore it to a state in which it can perform its required function(s). The two processes mentioned are "retaining" which refers to preventive maintenance works carried out in anticipation of failures, and "restoring" which are corrective works carried out after the failures.

Maintenance can be subdivided into two basic categories, with associated subcategories as follows:

2.1.1 Planned Maintenance

- *Preventive/Predictive Maintenance* – a planned and controlled programme of periodic inspection, adjustment, and replacement of components, as well as performance testing and analysis, sometimes referred to as a preventive maintenance programme

- *Corrective* – repair or replacement of obsolete, worn, broken, or inoperative building sub components or sub systems

2.1.2 Unplanned Maintenance

- *Reactive* – unplanned maintenance of a nuisance nature, requiring low levels of skill for correction. These problems are usually identified and reported by Facilities users

- *Emergency* – unscheduled work that requires immediate action to restore services, to remove problems that could interrupt activities, or to protect life and property

2.2 Maintenance of Schools at MEHR

To carry out its activities, the MEHR has split the island into four Zones. With respect to infrastructures, the MEHR has within its organisation structure the IMU which is responsible for ensuring that Schools are safe and in good physical condition, and infrastructural projects are timely implemented. Each Zone has a MU.

Maintenance works in Schools are carried out at different levels within the Ministry. Details are given in Table 1.

Table 1 Units Carrying Out Maintenance Works within MEHR

Level	Nature of Work	Value	Undertaken by
School	Minor (e.g. replacing a defective tap or a broken window pane)	Small (met from Imprest or PTA funds)	School personnel (e.g. Caretaker) or private parties
Zone MU	Minor repairs (e.g. replacement of doors, windows, painting, tiling and fencing works)	Up to Rs 500,000	MU staff comprising Inspector of Works (IoW), Assistant Inspector of Works (AIoW), Masons, Carpenters, Painters, Plumbers, Welders, Electricians and other Tradesmen, under the supervision of Technical Officers (TO)[3]
	Not complex, but of larger scope (e.g. painting of School blocks)	Above Rs 500,000 (with special approval from IMU)	
	Complex	Up to Rs 500,000	Private Contractors under supervision of TO
IMU	More complex and of larger scope (e.g. replacement of naco frames, painting, renovation of toilets and waterproofing works)	Above Rs 500,000 and up to Rs 50 million[4]	Private Contractors under supervision of IMU Engineers and TO

Source: MEHR

2.3 Other Key Players and their Activities

The Ministry is also supported by two key players to maintain School Buildings, PTA and MPI.

2.3.1 Parent Teacher Association (PTA)

The PTA is an independent association comprising students' parents and teaching personnel of the School. It promotes the welfare of students, provides support to the School, and helps towards enhancing its physical environment, equipment and other facilities, and operates in line with the policy of the MEHR. The latter provides PTAs different types of grants that can be used to maintain School buildings. Of these, the most substantial is the Special Grant used to finance approved projects whose costs the PTA is prepared to partly finance (from their own funds). The quantum for this grant has varied from Rs 200,000 to Rs 700,000 per School during the past years.

[3] In the four Zones, there are eight TOs, four IoWs, four AIoWs and some 100 Tradesmen. The TO surveys School Buildings, prepares scope of work and advises the Zone Director on maintenance and infrastructural issues.

[4] The Rs 50 million threshold allowed under the Public Procurement Act generally applies to new constructions or major upgrading and not to maintenance works. The IMU has, in recent years, implemented maintenance projects costing at most Rs 600,000.

2.3.2 Ministry of Public Infrastructure (MPI)

Since financial year 2004-05, the Civil Engineering Section of MPI has been selecting private Contractors, on a region-wise basis, to carry out maintenance, repairs, renovation, refurbishment, upgrading and rehabilitation of Government buildings. These works whose scopes are larger (compared to IMU driven jobs) are supervised by the Civil Engineering Section which has the required expertise and staff to handle such projects. The value of such works does not exceed Rs 5 million (excluding VAT).

2.4 Identifying Maintenance Needs, Planning and Monitoring

Maintenance needs for Schools are identified at different levels throughout the year. Heads of Schools undertake inspections before the start of each School term under the School Readiness Programme. Zone, IMU and MEHR personnel also identify maintenance works to be carried out during their visits to Schools. Reports from Health and Safety Officers on Schools are also useful. Complaints/requests from PTA also trigger investigations and identification of works to be executed.

The IMU requires Zone Directorates to submit an implementation programme at the beginning of the year, showing how they intend to carry the maintenance projects. They also have to submit quarterly updates on the progress of the works, and participate in quarterly monitoring meetings held by IMU.

2.5 Process Description

This Section describes the process for carrying maintenance works by Zone MU, IMU and MPI. It also describes the procurement process at different levels.

2.5.1 Maintenance Works

Zone Maintenance Unit

Schools request Zone Directorates to carry out maintenance works which cannot be done at their level. Zone MU records the requests in a “Request for Works” Register. Each request is assigned a rotation number. Zone personnel process the requests and thereafter the Director gives his/ her approval. The works which are supervised by Zone MU are either executed by Tradesmen or contracted out. Zone Directorate can also refer the request to be attended by the School’s PTA through use of its Special Grant.

Urgent requests are attended to immediately by the MU by redeployment of its staff from other sites. Non-urgent works are processed during monthly Infrastructural Committee Meetings. Site visits and surveys are carried out by TO’s, IoW’s and AIoW’s to assess the maintenance requirements of approved requests. Thereafter, the maintenance works are carried out by MU, or contracted out or referred to IMU.

Weekly plans of works are prepared and are approved by Management. The plan gives details of the allocation of works and site visits to be performed. Different formats of the plan are

used by the Zones, but basic information, such as School name, rotation number, detailed description of work to be performed, and brief report on issue/survey/project attended to are included. Tradesmen and Assistant Tradesmen are required to fill in Job Sheets as a record of their daily work performed. Job Sheets show work performed, attendance and certification (of work done) by School management, among others.

Infrastructure Management Unit

In order to implement maintenance projects falling under its responsibility, the IMU has two Civil Engineers, assisted by TOs. The Unit holds discussions with School management, carries out surveys, prepares scope of works, drawings, specifications, cost estimates and bidding documents. Works are carried out by selected private Contractors.

After selection of Contractors, contract documents showing start and completion dates, value (including Contingency amounts), description and specifications for the work(s) are drawn.[5] Specifications used are the Government of Mauritius Standard Specifications issued by MPI. These specifications lay down the minimum standards to be observed for materials used and workmanship during execution of the works. At each step during execution, clear technical requirements are also specified.[6] In addition to the MPI standard specifications, the IMU also includes its own specifications by customising the former.

Works start following a formal handing over of the site. During the meeting, important contract requirements are highlighted. The Contractor's obligations with regard to submission of Compliance Certificates for all materials to be used, concrete mix which he intends to use and concrete cubes test results, if any, are stressed. The Contractor is, also, requested to keep on site at all times a Site Instruction Book (in triplicate copies), among others. Frequency of site meetings (fortnightly) and visits (weekly) is also set.

A good practice is the maintenance of documentation on each job, from commencement to final acceptance of the works. This includes contract documents, minutes of site meetings, Instruction Sheets, invoices and Payment Certificates, and Partial and Final Taking Over Certificates, among others. Contract management, monitoring, supervision of works, payment certification, penalty application, practical and final taking over of works are all performed by the Engineers and TOs of IMU.

Ministry of Public Infrastructure

Contractors, commonly known as District Contractors (DCs) selected by MPI, enter into contract with the latter for the "Maintenance, Repairs and Rehabilitation of Government Buildings".[7] Contract documents that follow the model recommended by the PPO show start and end dates, description, specifications[8] and rates for each item of work, and drawings. General Conditions of Contract include those issued by the PPO and the "Conditions of

[5] Contract documents follow the model recommended by PPO.
[6] The specifications cover a whole range of materials and works needed for a building, such as concrete and reinforcement, masonry, carpentry, plastering, tiling, glazing, painting, plumbing and for waterproofing system.
[7] The island has nine Districts, and Plaines Wilhems is delimited between Lower and Upper. 10 Contractors are selected. One Zone may cover two to three Districts. Thus, a similar number of DCs may be called to work in a Zone. As per MPI, some five months are required to appoint DCs. It may take longer when unsuccessful bidder(s) challenge the award.
[8] Government of Mauritius Standard Specifications issued by MPI.

Contract" (First Edition 1999) issued by the "Federation Internationale des Ingenieurs-Conseils" (FIDIC)[9].

Maintenance works to be carried out by the Contractors are indicated on Works Orders (WO) which are signed by representatives of MPI and the Contractor. The steps leading to the issue of this document and MPI's intervention during the execution phase up to final handing over are shown in Table 2.

Table 2 – Steps Leading to Issue of Works Order and MPI's Intervention until end of Works

Step	Remarks
Request for maintenance works from Ministry	At the beginning of the year, the Ministry sends to MPI its list of priority projects. To undertake each project (on the list or a new one), a request needs to be made.
MPI meets Ministry's representatives to discuss scope of works, and carries out survey and prepares cost estimate.	Ministry's representatives are IMU and School management
Confirmation of availability of funds by Ministry	Earmarking of funds for job at Ministry signifies the "go ahead" for the work
Works Order (WO) issued	No WO is issued until funds are confirmed by Ministry and a request for its issue is made. The WO is normally issued following a site visit carried out by MPI and the Contractor during which MPI indicates to the Contractor the works to be carried out. The two parties agree on the commencement and completion dates. These dates, the items of works and their estimated value (including any Contingency amount) are shown on the WO.
Handing over of site	This is done through a formal site meeting attended by representatives of the Ministry, MPI and Contractor
Contract management, monitoring and supervision of works by MPI	These are done by the MPI Engineer and a TO who have been assigned the job, during site visits and meetings. Oral and written instructions are given by MPI officials. Clause 1.8 of the Particular Conditions of Contract requires the Contractor to provide to the Engineer with an Instruction Book (with triplicates) and to keep, on site, one copy of the written instructions issued by the Engineer or Engineer's representatives.
Certification of application for payment and penalty application (if any) are ensured by MPI	Certified applications for payment are paid by the Ministry
Practical and Final Completion Certificates issued	On practical handing over, a snag list of works is drawn that need to be attended to within the Defects Liability Period. On satisfactory completion of the outstanding works or correction of defective works, the Final Completion Certificate is issued.

Source: MPI

A good practice is the maintenance of documentation on each job, from commencement to final acceptance of the works. This includes the WOs, Compliance Certificates, minutes of

[9] FIDIC, the International Federation of Consulting Engineers, represents globally the Consulting Engineering industry. It promotes the business interests of Consulting Engineering organisations, consistent with the responsibility to provide quality services for the benefit of society and the environment.

site meetings, Instruction Sheets, invoices and Payment Certificates, Partial and Final Taking Over Certificates, among others.

The MPI has a practice to allocate the monitoring and supervision of works to a team of Engineer and Technical Staff for an average of seven concurrent projects. According to MPI, this ensures that the workload is not in excess of what its labour force can handle adequately.

2.5.2 Procurement

Procurement for goods and services for maintenance works is carried out at different levels. Different procurement methods are used. A brief description of the process is at Table 3.

Table 3 – Procurement Process at Different Levels

Level	Procurement Method	Remarks
School	Direct Procurement	Direct purchases are for minor goods and services using Imprest money
PTA	Request for Sealed Quotations	Three quotations are sought for expenses financed through Special Grants
	Direct Procurement	Direct purchases are effected when using other grants made available to the PTA
Zone MU	Request for Sealed Quotations/ Restricted Bidding	For maintenance works, costing up to Rs 500,000, and goods and services worth at most Rs 250,000
	Direct Procurement	For minor items and services.[10]
	Each Zone has a Procurement Section. Quotations/bids are evaluated by the Zone Tender Committee. Letter of Awards are issued by the Procurement Section and contracts are entered with the Zone Directorate.	
IMU	Restricted Bidding	For maintenance works costing above Rs 500,000
	The Ministry's Central Supplies Division is a Unit responsible for procurement. It floats tenders, evaluates offers received with the assistance of MPI or IMU expertise, as the case may require, and awards the contract.	
MPI	Open Advertised Bidding	Contractors are selected annually by the MPI for the Maintenance, Repairs and Rehabilitation of Government Buildings contracts through the Central Procurement Board (CPB)[11]. Contracts are awarded by, and entered with, the MPI.
	The CPB vets bidding documents and notices submitted to it by MPI, receives and publicly opens bids, selects persons from its list of qualified evaluators to act as members of a Bid Evaluation Committee, oversees the examination and evaluation of bids, reviews the recommendations of the Bid Evaluation Committee and approves the award of the contract.	

Source: MEHR

[10] For each good and service valued between Rs 20,000 and Rs 100,000, three quotations are sought.

[11] The CPB is a body corporate established under the Public Procurement Act, responsible for the approval of award of major contracts by Public Bodies.

2.6 Budgeting and Funding

The approach adopted by the Ministry to secure funds to meet maintenance expenditure is summarised below:

(a) Before the end of a current year, the Ministry requires each School (through the Zone Directorate) to identify and list projects and maintenance works to be executed at the School during the next financial year. The list is submitted to its Zone Directorate.

(b) Each School's list is examined at the Directorate, and a priority list of projects/maintenance works at Schools is compiled for the Zone.

(c) Each Zone's priority list is submitted to the IMU which examines and filters the most important projects or works.

(d) Estimates are worked out for the developed lists and are consolidated into budget estimate proposals.

(e) Following approval of the budget, the lists of priority projects/works are reworked taking into consideration funds made available.

(f) New lists of projects/works to be executed by the Zone Directorates, IMU and MPI are drawn by the IMU. The lists are prepared Zone wise.

(g) Maintenance expenditures for Zones and IMU are met from Budget Item "Maintenance". Funds are allocated using the following criteria:

- budget amount available
- number of Schools in the Zone
- list of priority projects
- project implementation/spending capacity of the Zone
- amount payable to PTA (Special Grant)

Funds may be reallocated between Zone Directorates and IMU as and when the need is felt during the year.

(h) Maintenance expenditures for works carried out by MPI's DCs are mainly met from Budget Item "Upgrading of Schools".

CHAPTER THREE

FINDINGS

This Chapter describes the findings on whether the Ministry has an appropriate system for maintaining School Buildings to time, cost and quality. Highlights of the findings precede the relevant Sections.

- **Schools visited showed several infrastructural problems. Cracks and leakages were the most common.**
- **Infrastructural problems noted were widespread in the Zones. Maintenance done was mainly corrective.**
- **Records kept on infrastructures were not adequate for planning and decision making on maintenance.**
- **Annual maintenance plans were not drawn and monitoring of works was inadequate.**
- **More than 50 per cent of the prioritised works to be carried out by Zones were still outstanding at year end.**
- **Funds available were not fully used.**

3.1 State of School Buildings

Visits to 23 Schools in Zones 1 and 2 in July/August 2014 revealed a number of maintenance issues faced by them. The most common and serious problems were ceiling and/or wall cracks, and leakages during rainy periods. These caused much discomfort to users and affected the smooth running of Schools. At Petit Verger Government School (GS), Science classes could not be dispensed in a recently built Science Block due to leakages. At Quartier Militaire State Secondary School (SSS) and Queen Elizabeth College (QEC) pails had to be used in the Administrative Offices to collect dripping water. Several Schools had their roofs waterproofed, but cleaning of the treated surfaces was not done. There were other issues, such as damaged paintwork and rusty metal works/infrastructures, damaged tiles and toilet problems. Certain Schools were relatively well maintained, like Barkly GS, Rajiv Gandhi GS, S Virahsawmy SSS (except for leakages in some parts of the building at the latter) and S Jugdambi SSS.

Infrastructural problems observed at the selected Schools were reported by most Schools in both Zones. Requests for maintenance received from Schools between 2012 and 2014 related mainly to the issues mentioned above, with varying degrees of severity. For example some 15 per cent of the requests related to cracks, spalling and leakages, and about 13 per cent to toilet problems.

The MEHR, together with its partners in maintenance, strive to keep its Schools in good condition. However, several issues associated with the maintenance system do not allow it to achieve the best results. These are discussed in the paragraphs below.

3.2 Maintenance Strategy

Presently, MEHR does not have a strategy that balances planned and unplanned maintenance works. The maintenance works examined in the two Zones indicated that these were mainly of corrective, reactive and emergency nature. Preventive maintenance is an important component that checks deteriorations from creeping in and ensures infrastructures are cared for early. Problems tackled a later stage are most likely to aggravate and disrupt School activities. They are, also, more costly to deal with, later.

According to the Ministry there is a preventive maintenance strategy which includes, amongst others, regular painting of schools and institutions.

However, our findings indicated that the focus of the Ministry was on corrective maintenance.

3.3 Periodic Review and Records of Conditions of Buildings

Good practices require a periodic review of the conditions of buildings. These include a physical inspection of buildings, assessment of the actual conditions of individual elements, services and buildings, and identification of maintenance works required to bring the condition of the building up to a specified condition standard.[12] The Ministry did not carry out this periodic review. Records, such as School layout plan, description and conditions of individual blocks, classrooms, history of major maintenance and interventions were not kept. Information were collected during inspections, at School level, that helped to assess School readiness before resumption of studies and, at Zone and IMU levels, that contributed to preparation of priority lists for maintenance activities. Records at Zone level contained maintenance requests received from Schools and explained how they were attended to. However, these information did not fully reflect the state of infrastructures, and were not helpful to draw a plan to cater for the maintenance needs of the buildings over the immediate, medium and long terms.

At several Schools visited in both Zones, management was not aware of certain features thereat. For example, at S Jugdambi SSS and Pamplemousses GS (in Zone 1) and Quartier Militaire SSS and Shri Rajiv Gandhi GS (Zone 2), management had limited knowledge on waterproofing works done at the Schools – which block?, since when?, whether still under guarantee, and conditions for the guarantee to stand. For S Jugdambi SSS, neither the School, Zone, IMU nor MPI had records on the warranty on waterproofing works.

Often decisions, like approval for the painting of Mohabeer Foogooa GS in Zone 1, have been taken in the absence of records on the maintenance history of the building.

The Ministry contended that regular checks are also, carried out by the Technical Officers and the Engineers to detect possible spalling of concrete.

[12] Maintenance Management Framework of the Department of Housing and Public Works, Queensland Government, Australia (www.hpw.qld.gov.au)

However, the above exercise is not carried out in a planned manner by the Ministry and is insufficient to provide a periodic assessment of the condition of the buildings and maintain updated records on their conditions.

3.4 Annual Maintenance Works Programme and Monitoring of Works

An annual programme or plan describes in detail what is proposed to be carried out, sets priorities, defines time frames and quantifies human and financial resources. The plan needs to be realistic and reviewed whenever the need is felt. The MEHR did not prepare an annual maintenance work programmes. It had only annual individual lists of prioritised works. Time frames to execute jobs and need for resources were not defined.

During the period 2012 to 2014, Zone Directorates did not submit annual implementation programmes and quarterly updates on progress of works as required by IMU. Quarterly meetings were not held to monitor progress of work by IMU.

Planning and monitoring of maintenance works at Zone level also differed.

In Zone 1, at the monthly Infrastructure Committee meetings, new requests from Schools were discussed, analysed and works allocated to responsible Officers. However, the time frame to execute these works was not set by the Committee.

On the other hand, time to perform the individual works was decided by Officers of the Inspectorate Grade and inserted on plans of work for MU staff. Management did not measure the actual time taken and compared same with the preset time to perform the works. This did not help management to monitor the works and assess performance of staff.

In Zone 2, the practice to hold monthly meetings was discontinued as from January 2014. Management examined all requests received, and those approved were channelled to the TOs for necessary action. Plans of work drawn for MU personnel were not time framed. This prevented monitoring of works to time.

The Ministry stated that “there is proper planning of both major and minor maintenance to be carried out in each coming financial year. In this respect, the list of these works is well established in order of priority and available at the Ministry”.

However, establishing the priority list is only part of the planning process. Time frames and resources requirement allocated for the maintenance works were missing.

3.5 Budgeting

Budget proposal for maintenance prepared by the Ministry was not based on a realistic calculation of the level of funding needed to maintain its School buildings. Only rough estimates were worked out for priority lists of works guided by previous years’ expenditures, spending capacity and ceilings set by the Ministry of Finance and Economic Development for inclusion in budget proposals.

Funds budgeted under Items "Maintenance of schools" and "Upgrading of Schools" in recent years were not fully used as shown in Table 4.

Table 4 Funds Available and Spent (all four Zones)

Year	Maintenance of Schools			Upgrading of Schools*		
	Available** Rs million	Spent Rs million	% Unspent	Available** Rs million	Spent Rs million	% Unspent
2012	83	76	8	134	107	20
2013	70	67	4	191	131	31
2014	81	67	17	158	140	11

Source: MEHR
*****Excludes Primary School Renewal Project (PSRP) and Grants to PTA.
****** After reallocations

Maintenance works financed from Budget Item "Maintenance of Schools" were those carried out mainly by Schools, MU and IMU. Those financed from "Upgrading of Schools" were mostly executed by DCs. Maintenance works at Zone level also included refurbishment of classrooms in Primary Schools under the Sankoré Project.[13]

Since 2011, works under the Sankoré Project comprised wall repairs/plastering, painting, tiling, burglar proofing, as well as electrical works undertaken by the Energy Services Division of MPI. These works were not included in the Zones' priority lists. A significant proportion of funds was spent on these works. With the reduced level of each Zone's funding and with reallocations, other maintenance works were executed. Relevant figures for 2014 are in Table 5.

As of end of September 2014, only Rs 398,000 were available for maintenance activities in Zone 1, and by year end only Rs 300,000 were utilised. Total funds used at this Zone allowed 41 per cent of prioritised works to be executed. The Ministry's practice to reallocate funds between Zone Directorates and IMU was not availed of by Zone 1. At least 17 per cent of funds under "Maintenance of Schools" were available in the Ministry's vote as at September 2014 (see Table 4 above).

In Zone 2, funds totalling Rs 10.5 million were reallocated. This allowed it to carry important painting works (costs ranging from Rs 900,000 to Rs 3.5 million) at four Schools that were not originally included in its priority list. These affected execution of other priority works which had to be deferred, and caused the proportion of overall unattended works to stand at 76 per cent at year end.

[13] The Sankoré Project involves equipping all Primary Schools with interactive equipment, as well as educational software with a view to facilitating the provision of education to children through innovative technologies. The interactive equipment, white boards and projectors, were donated by the French Government. Classrooms needed to be adequately prepared to accommodate these equipment and for conduct of classes.

Table 5 Funds Available for Maintenance Works in 2014

	Zone 1		Zone 2	
	Primary	**Secondary**	**Primary**	**Secondary**
Estimated Cost of Maintenance Works as per Priority List (Rs million)	11.4	3.1	5.2	4.1
Initial allocated budget (Rs million)	6	2	6	2
Reallocation (Rs million)	-	0.05	1.56	8.96
Value of Sankoré Project works (Rs million)	3.6	-	3.96	-
Proportion of Initial Budget used by Sankoré Project (%)	60	-	66	-
Funds available for Maintenance Works	2.40	2.05	3.60	10.96
Unspent balance (Rs million)	0.1	-	-	-
Works on revised priority list* completed	11 out of 25	3 out of 9	10 out of 40	6 out of 26
Overall unattended works on (amended) priority list (%)	59		76	

Source: MEHR
* List is revised to cater for new works identified/ executed during the year

The late or non-appointment of DCs in 2012 and 2013 meant that several maintenance works could not be executed. Some 25 per cent of available funds under "Upgrading of Schools" were unspent during 2012 and 2013 and lapsed. It is worth mentioning that in mid-2013, MEHR requested its IMU and MPI to launch tenders, as an alternative measure, to have Schools repaired and maintained.[14] This course was, however, not followed as it involved the time consuming processes of preparing detailed tender documents for each work, floating of bids, evaluation and award of contracts. Thus, again, voted funds could not be used.

The under spending of funds in a given year generally results in lesser funds being approved for the next year. Table 6 shows funds applied for by MEHR and approved by the Ministry of Finance from 2012 to 2014. Less and lesser funds were allocated.

Table 6: Funds Applied for and Approved under "Upgrading of Schools"

	2012	**2013**	**2014**
Funds requested (Rs million)*	339	321	336
Funds approved (Rs million)*	446	234	237
Surplus/(Deficit) (Rs million)*	107	(87)	(99)

Source: MEHR
*Gross amount of Vote Item (includes PSRP and PTA Grants)

[14] When no WO can be issued to MPI's DCs, the Public Procurement Act allows recourse to sealed quotations for works less than Rs 5 million, open advertised bidding for works exceeding Rs 5 million and emergency procurement on a case to case basis. The request for individual tendering was in respect of 28 waterproofing works, 17 spalling/cracks repairs and 13 upgrading/repairs of toilets.

DC's are appointed for a period of 12 months that will inevitably straddle two financial years if appointment is not made at the start of a financial year. As funds are always made available for a financial year, the proportion that cannot be used due to unavailability of DC's is likely to lapse. The utilisation of funds is subject to issue of WO which is itself subject to availability of resources at MPI. Under these circumstances, it becomes important that DCs are appointed at the beginning of the financial year to allow a maximum use of allocated funds.

3.6 Maintenance Works

- **There were backlogs on both major and minor maintenance works.**
- **The non appointment of DCs on time, inadequate planning and budget monitoring were the main causes for the accumulation of unattended maintenance works.**

3.6.1 General

Requests for maintenance of buildings received in Zones 1 and 2 during the period January 2012 to May 2014 were analysed. Maintenance works could be broadly categorised as major and minor ones. Major works included repairs of cracks, spalling, roof leakages and repairs/upgrading of toilets. Though the number of requests for these works did not top the list, they related to the most important problems that disrupted Schools. These are classified as priority by MEHR and are attended by IMU and MPI. Minor maintenance works comprise plumbing, tiling and painting, among others, that are dealt with at School, PTA and Zone level. In both categories, there were backlogs.

Backlog on Important Maintenance Works

Backlogs on these works had built up due to the late or non-appointment of DC's by MPI in 2012 and 2013.[15] During the period August 2012 to July 2013, services of DCs were not available. Thus, not all works scheduled for execution in 2012 and 2013 by MPI could be carried out. Unattended works had to be rolled over for execution in succeeding years, and as at December 2014, 15 such works (31 per cent) in both Zones were still outstanding. A few examples are shown in Table 7.

[15] Bidding exercise for selection of 2012 DCs was carried out, but none was appointed. One unsuccessful bidder lodged a case before Supreme Court. The Attorney General's Office advised to await judgement before award of contract. Court hearing in late 2012. Launching of new tenders for 2013 DCs was deferred until January 2013 due to Court hearings in 2012. Award of contract for 2013 DC was challenged before the Independent Review Panel.

Table 7 Priority Works to be Carried out by DC Outstanding as at December 2014

Zone	School	Maintenance Works	In Priority List Since
1	J.M. Frank Richard	External painting	2012
1	Notre Dame GS	Replacement of Naco Frames	2012
1	Mohabeer Foogooa GS	Upgrading of toilet	2013
2	Bon Accueil State College	Laying of tiles	2012
2	Stanley GS	Upgrading of toilet	2013
2	Shrimati Indira Gandhi SSS	Waterproofing & treatment of expansion joint	2013
2	Ebene SSS	Waterproofing works	2014

Source: MEHR

Whenever the services of DCs were available, the established practice of handling seven Government maintenance projects at any one time by each supervising team (comprising one Engineer and one TO) was followed by MPI. This allowed only 33 works (out of 48 identified) to be executed/started from 2012 through 2014 in the two Zones. Seven works could not wait for appointment of DCs. They were so pressing that the Zone MU had to carry them out.

Backlog on Minor Maintenance Works

The main reasons for the backlog on minor maintenance works were inadequate planning and monitoring as mentioned at paragraph 3.4 above. Statistics in both Zones were not readily available. A few examples of works backlogged are given in Table 8.

Table 8 Backlogs in Minor Maintenance Works in Zones 1 and 2

School	Date of Request	Maintenance Work	Status as at December 2014 and Remarks of Zone Directorate
P Louis North SSS (Zone 1)	5.03.13	Gutter to be repaired, leakage along corridors, moulds on stairs.	To be carried out at Zone level. List of materials sent to Procurement Section.
B Khemloliva GS (Zone 1)	21.3.14	Accumulation of water on roof. There is no access to roof.	Outstanding .Request sent to IMU.
Pamplemousses GS (Zone 1)	30.06.14	Sign of Termites in ICT Classroom.	Outstanding. Zone personnel not available.
Camp de Masque SSS (Zone 2)	2013	Repair of gutters and rainwater pipes.	Outstanding. Facilities such as scaffolding not available.
QEC (Zone 2)	2012-13	Repairs to water distribution network (several requests)	Partly completed. Awaiting supply of new water pump as at May 2015.
M. Rambarrun GS (Zone 2)	2013	Plastering of walls and painting	Outstanding .Scope of works prepared in 2015

Source: MEHR

3.7 Maintenance Works Funded by PTA Special Grant

Maintenance works carried out with Special Grants to PTA related to tiling, painting, ceiling and toilet repairs mainly. In 2012 and 2014, Special Grants allocated to the 130 Primary Schools and 37 Secondary Schools in Zones 1 and 2, amounted to some Rs 111 million and some Rs 34 million respectively. No Grants were disbursed in 2013. An analysis of the 2012 Grants spent showed that the proportion used for maintenance of buildings varied from School to School. In Zone 2, up to 47 per cent of the Grants were used at LPK Boolell GS, but none at QEC. These works were approved, but were not supervised, by the Zone Directorates. During visits to selected Schools in the Zones, how works were executed and their quality could be noted. Tiles laid in classrooms and corridors of several Schools were not properly levelled. At the Sir Leckraz Teelock SSS, new metal bars were welded onto the old rusty ones of handrails in an attempt to repair same. For metal works, bars should be properly treated (if they can be repaired) or removed (if they are beyond repairs) before fixing new ones. At the Pamplemousses GS, tiling works were effected in the corridor using PTA Grant in 2012. During site visit in July 2014, it was observed that at several places, tiles were detached and broken. The absence of supervision caused works not to be correctly executed and affected the quality of the jobs.

Although the Ministry pays substantial grants to Schools' PTA and requires the Zone Directorates to approve projects funded by same, it did not supervise the works to ensure that these jobs meet a minimum standard.

3.8 Zone Maintenance Unit

- **Projects examined were not adequately monitored.**
- **Insufficient supervision on jobs affected their delivery to time, cost and quality.**
- **No benefits were derived from lost labour hours paid for by the Ministry.**

3.8.1 Records on Planning and on Execution of Maintenance Works

Weekly plans and Job Sheets are important documents in helping the Zone MUs to monitor maintenance works. A sample of Weekly Plans and Job Sheets prepared in both Zones in 2014 was examined. The following were noted:

- Plans were not approved by management.
- No rotation number of request being attended to was inserted on both plan and Job Sheet.
- In Zone 2, no estimated time frame to attend to a request was set on the plan. For Tradesmen, often, several requests were grouped together and assigned to the maintenance team. For example for a week in February 2014, "Plumbing works at Brisée Verdiere, Ecroignard, Bon Accueil and J. Nehru GSs" were allocated to a team of three Maintenance Workers. The requests were neither identified nor described and no time scale given to work on each. In Zone 1, requests were correctly described and time

allocated to attend to same recorded thereon. However, how time frames were worked out could not be explained.

- "Time Out" on Job Sheets in both Zones was in most cases stated as "14.00 pm". Normal working times for Tradesmen are 7.30 am to 3.30 pm.

- On some monthly Job Sheets, description of "Work Done" or certification by School management was missing.

3.8.2 Execution, Monitoring and Supervision of Works

In performance terms, works are efficiently and effectively executed, monitored and supervised when they are completed and delivered to time, cost and quality. Through an examination of the weekly plans for the period January to May 2014, it was found out that in Zone 1, as low as 50 per cent of available labour hours for IoW and AIoW were utilised for monitoring and supervision of works, and the rest of the time was devoted to surveys and office works. This affected the delivery and quality of works. During visits to Schools this could be established.

Time

In Zone 2, the absence of requests rotation numbers on plans of work and Job Sheets and time frames on the former meant that these documents could not be matched and, more importantly, ascertaining whether tasks were delivered to time was not possible. The documents do not allow the monitoring of works executed.

In Zone 1, weekly plans of work and Job Sheets prepared could be matched to assess timely execution of works. However, this exercise was not done. At the Droopnath Ramphul State College, three Tradesmen were asked to carry "Renovation of podium in laboratories" over seven working days as per two consecutive weekly plans (5 + 2 days). The job was completed in three days only during the first week. The workers remained on site for four additional days to attend to new works requested by the School management. For these additional works, there were no official request to, and approval of Zone MU. This case illustrates that plans were not correctly drawn based on workload assessment and the absence of monitoring.

Cost

Maintenance works consume materials and labour.

- Materials. Procurement of materials at Zone level followed the established procurement procedures, and materials and/or services were acquired at reasonable cost.

- Labour. Early departures from sites of work by Maintenance Workers and recorded on Job Sheets (certified by the Headmaster or Rector at whose School works were carried out) represent paid lost labour hours for the Ministry. Each worker departing 1½ hour earlier than he should everyday works out to 360 hours of productive labour hours lost

annually (duty is attended on some 240 days in a year). This is equivalent Rs 2.2 million[16] worth of labour paid for every year, for both Zones, but for which no benefits were derived by the Ministry.

In the PRB Report 2013, it is emphasised that "officers should work within prescribed hours". The Ministry has not taken necessary action against the workers. This has led to a situation where Tradesmen take it for granted that they can leave early. The labour lost or foregone might have caused other works to be unduly delayed.

The Ministry explained that when compared to the number of schools and colleges, the Maintenance Unit is under staffed and is making optimum use of the labour force available.

However, our findings described above, showed that optimum use was not made of available labour hours.

Quality/Completeness

For some works executed by MU personnel, quality/ completeness was lacking.

At the L.P.K. Boolell GS (Zone 2), tiles laid in classrooms were not levelled. As unlevelled tiles are prone to breakage, the lifetime of the flooring is most likely to be affected. More importantly, such a surface is not user friendly. Users run the risk of falling on same. In the same Zone, at Vele Govinden GS, a washbasin installed in the Headmaster's office by the MU was seen not to be levelled. Pieces of a carton sheets were used by School personnel to try to keep it horizontal.

[16] Productive working hours total seven hours only for a Tradesman in his normal 7.30 am to 15.30 pm daily working times. The 360 hours lost is thus equivalent to some 51 days (360/7) or 2½ months' work. This represents some Rs 1.1 million labour in a Zone

3.9 IMU and MPI Maintenance Works

- **The recommended practices for procurement of maintenance works at IMU were followed.**
- **Proper agreements were drawn with Contractors.**
- **Processes relating to extension of ongoing contracts with MPI's DCs were done in compliance with the provisions of the law.**
- **Inadequate monitoring, supervision and contract management were noted on several jobs.**
- **Certain contract requirements were not followed on some works. This led to maintenance works not being satisfactorily carried out, and in turn caused inconvenience to users.**
- **Insufficient documentation during the execution phase of most works was also noted.**

3.9.1 IMU Maintenance Works

Procurement

For selected works executed in the two Zones by IMU, the established procurement procedures mentioned at paragraph 2.5.2 were followed.

Execution, Monitoring and Supervision (Zones 1 and 2)

Details and the findings made on works carried out by the IMU and examined are given in Table 9 for Zone 1 and Table 10 for Zone 2.

For Zone 1, two projects (one waterproofing and painting, and the other one waterproofing only) were carried out by the IMU, and for Zone 2, three works (one waterproofing only, one painting only, and the last one waterproofing cum painting) were undertaken. The waterproofing works of Zone 1 and the last two mentioned works of Zone 2 were selected for examination.

Table 9 IMU Maintenance Works in Zone 1

School	Xavier Barbe GS	Pointe aux Sables GS	Emmanuel Anquetil GS
Description of Works	Waterproofing, repair of cracks and painting in classrooms of Pre-Primary Units (PPU)		
Contract Details and Actual Completion Date	*Start date*: 11 Nov 2013 *Scheduled completion date*: 27 Jan 2014 *Revised completion date*: 13 Mar 2014 *Amount*: Rs 584,027 *Completion date*: 20 May 2014 (with a delay of 57 days)		
Execution	As per contract except: ▪ screed[17] not laid as per specifications; ▪ no 24 hour water test[18] done	As per contract except no 24 hour water test done	As per contract except no 24 hour water test done
Monitoring and Supervision	Screed thickness/slope and primer checked. Cracks and spalling[19] repairs checked. Approval given for 1st waterproofing membrane[20].	Screed thickness/slope and primer checked	Screed thickness/slope and primer checked Approval given for 1st waterproofing membrane only
Remarks	No documentary evidence for inspection of : ▪ paintwork ▪ 24 hour water test in February 2015	No documentary evidence for: ▪ approval for 1st waterproofing membranes ▪ inspection of cracks, spalling repairs and paintwork ▪ 24 hour water test in February 2015	No documentary evidence for: ▪ inspection of cracks, spalling repairs and paintwork ▪ 24 hour water test in February 2015

Source: School Project Files

[17] A levelled layer of concrete applied to the roof or surface being waterproofed.
[18] The 24 hour test consists of filling the whole treated area with water (after plugging water pipes outlets) and retaining the water on the treated surface for 24 hours, and then checking for any leak. The 24 hour test is, also, referred to as "Ponding Test" (by IMU).
[19] Spalling refers to concrete that has broken up, flaked, or become pitted.
[20] It is a sheet made of impermeable bituminous materials. In waterproofing works, two layers are usually laid. Extreme care, supervision and strict adherence to manufacturer's recommended procedures.

Table 10 IMU Maintenance Works in Zone 2

School	R. Balgobin GS	L.P.K. Boolell GS
Description of Works	External painting works	Waterproofing and external painting works at Pre-Primary Unit
Contract Details and Actual Completion Date	*Start date*: 05 June 2013 *Duration*: 10 weeks *Amount*: Rs 392,150 *Liquidated damages*: 0.05% of contract price per day Works completed with a delay of 23 days.	*Start date*: 22 July 2013 *Duration*: 10 weeks *Amount*: Rs 299,230 *Liquidated damages*: 0.05% of contract price per day *Completion date*: 23 Sep 2013 (with a delay of 6 days).
Execution	Contractor complied with most contract requirements and obligations stated at site handing over.	As per contract.
Monitoring and Supervision	Additional cleaning of surface and fungicide treatment requested. Approvals or disapprovals of works on buildings or part thereof given; repairs on works requested. Liquidated damages at approved rates charged.	Instructions and approvals given on waterproofing works (laying of screed and two layers of waterproofing membranes only), casting of concrete platform and painting works. Screed thickness/slope not checked.
Remarks	Generally well executed, monitored, supervised and documented. During site visit in August 2014, School looked well painted and Headmistress expressed satisfaction on work executed.	Documentary evidences filed in September 2014, i.e. almost one year after completion of works. During site visit in August 2014, PPU looked well painted and it was reported that it was not suffering from leakages.

Source: School Project Files

It was observed that:

- Not all steps involved in waterproofing works were followed. For Zone 1 Schools, no 24-hour water tests were carried out. In November 2014, leakages were reported in all three Pre Primary Units (PPU). The Contractor was requested to remedy the defects and to carry out ponding tests in presence of IMU officers. Remedial works were done in February 2015. At end April 2015, there were still leakages at the PPUs at Pointe aux Sables and Emmanuel Anquetil GSs. The three maintenance works were not sufficiently documented as required by good practice.

- On the other hand, in Zone 2works at R Balgobin GS, were well documented. At LPK Boolell GS, certain documents were filed some one year after completion of works. It was explained that instructions/approvals were given during site visits, but copies of Instruction Sheets were not taken for filing. In September 2014, six sequentially numbered Instruction Sheets were produced.

  Moreover, a Certificate of Guarantee (for 10 years from the date of the practical completion on 4 October 2013) against leakage, defective materials and defective installation of the completed waterproofing system could not be produced.

3.9.2 MPI Maintenance Works

Processes relating to extension of ongoing contracts with MPI's DCs were examined. These were done in compliance with the provisions of the law.

Zone 1

Of 12 maintenance works at Schools in Zone 1 carried out by MPI's DCs during 2012 and 2013, five works carried out at Triolet SSS, GRNW GS, Adolphe de Plevitz SSS, Petit Raffray GS and Sharma Jugdambi SSS respectively were examined. These works, comprising waterproofing, repair of cracks and spalled concrete, painting, tiling and associated works, were executed by three different DCs and supervised by three different teams. Except for Triolet SSS, certain contractual tasks such as no-ponding test and 24 hour test were not carried out. Documentation in respect of supervision works on certain tasks was not available in Project Files in all the five cases.

With regard to Adolphe de Plevitz SSS, WO for waterproofing and tiling works was issued in May 2013. For the tiling works, the tiles used did not obtain the prior approval of MPI. In September 2014, the latter informed the Ministry that the works in the Library were not satisfactory and all tiles would be removed and replaced. As of November 2014, the building was still leaking despite the waterproofing works. MPI considered that the source of the ingress of water might be elsewhere, and it was taking action to identify it.

Following requests from my Officers, seven Instruction Sheets relating to waterproofing works only (repair of cracks and spalled concrete, painting, tiling and other associated works executed under the WOs were not covered) carried out at the Adolphe de Plevitz SSS, Petit Raffray GS and Sharma Jugdambi SSS were produced. These notes numbered, 701 to 707, from a single Instruction Book, were not sequentially and chronologically issued. This represented a discrepancy in matching the progress of work to time.

Zone 2

Of four Maintenance works carried out by MPI through its pre-selected DCs in Zone 2 during 2012 and 2013, those at Quartier Militaire SSS, QEC and Sir Leckraj Teelock SSS were examined. In two cases, namely at Quartier Militaire SSS and Sir Leckraj Teelock SSS, there was insufficient documentary evidence on the works.

- Quartier Militaire SSS (Girls). The maintenance works at this School comprised waterproofing and repair of cracks at the Administration and Science Classroom Blocks and Art Room. From commencement to end of works, no documentary evidence was available in the Project File that would help one to follow and assess how the works were executed, monitored and supervised. WOs were issued and the Practical Completion Certificate, dated 26 July 2012, and the Defects Liability Certificate of 20 December 2012 followed. It was explained that oral instructions were given.

  In mid July 2013, several months after Final Taking Over, leakages were reported in the Administration Block (C) and Science block (D). From records at the Ministry and information obtained at MPI, the source of the leakage in Block C had not been detected before or while executing the works in 2012. This shows that works under the WO were not complete, notwithstanding the issue of the Defects Liability Certificate. As of April 2015, the source of the leakage in Block C was still under investigation.

  The School management reported that the continued leakage problem in the "waterproofed" Administration Block C was still causing inconvenience to users.

  The Ten Year Guarantee Certificate against leakage, defective materials and defective installation of the completed waterproofing system to be submitted by the Contractor was not available.

- Queen Elizabeth College (QEC). Two jobs relating to repairs to podium and upgrading of toilets were carried out. Overall maintenance works at this School were properly executed, monitored, supervised and adequately documented.

- Sir Leckraz Teelock SSS. Works at this School comprised repair to timber flooring in gymnasium, tiling and waterproofing. Details on the maintenance job at this School are:

  - A WO was issued in October 2013 and at site handing over on 17 October 2013, new works, such as repairs to flooring (about 20 m^2) and upgrading of wooden fascia (infested with termites) of podium to an aluminium one were found to be necessary.[21]

  - Commencement date was postponed to 21 January 2014 as the Gymnasium was used to accommodate the end of year SC/HSC Examinations. Works started as scheduled, but had to be put on hold because the Gymnasium was leaking a lot, with heavy downpours in late January 2014. Some 30 per cent of timber polishing had been completed by that time.

[21] A request for these, together with other works related to the Gymnasium, was made to the Ministry in late October 2013 by the Rector. This was attended to by MPI in mid March 2014, and a new WO was issued on 25 April 2014.

- On 30 July 2014, another request was received from the Rector for new works in the Gymnasium. It was explained that when the previous survey (second, giving rise to WO issued on 25 April 2014) was carried out by MPI's and Ministry's TOs, in March 2014, "the Changing Rooms and parts of the Hall were packed with refuse... so that a full assessment of the renovation works was impossible".[22]

During a site visit at the School on 8 August 2014, works under the first two WOs which had resumed/started on 21 July 2014 were ongoing.

Comments on this job are as follows:

- Three surveys were carried out for the project. No survey reports were available.

- Surveys conducted were incomplete. Damages to 20 m^2 of timber flooring were not detected during the first survey. A few weeks later, the Engineer and all those attending the site handing over meeting found that this problem needed to be fixed.

- The leakage problem may not have been communicated to the survey team, but anyone about to treat wooden flooring would normally make sure that no rainwater leaks on such surfaces. During a visit in August 2014, it was clearly observed that dripping rainwater from the ceiling had bleached the timber flooring, at different spots. Therefore, waterproofing works were a must-do job there, but were omitted. Floor marking for practice of sports and timber skirting were also not included.

- For the execution phase, no documentation on the works was available in the Project File. It was explained that instructions were given verbally.

- As per Engineer's certified Payment Certificate, no liquidated damages were charged. For lack of documentation, extension of time granted, delays in execution and liquidated damages could not be ascertained.

According to the Ministry there is supervision of all works allocated to Contractors by both its Officers and those of MPI.

However, in some maintenance works examined as described above, supervision by the Ministry and MPI was inadequate.

[22] According to the Rector, following clearing of these areas, leakages, spalling, falling wall tiles and damaged urinals were observed in the Changing Rooms. Openings, water troughs and mirrors, therein, were, also, requested to be replaced. For the Hall, tiling works, timber skirting, varnishing of wooden structures and floor marking for practice of sports were asked for. In both areas, about 20 doors needed replacement. Following a survey (third), MPI worked out the cost estimate for the additional jobs to some Rs 2.96 million. A WO for renovation of Hall and Changing Room was issued in October 2014.

3.10 Ten Year Guarantee Certificate for Waterproofing Works

- **Guarantee Certificates for waterproofing works that did not conform to contract requirements were accepted.**
- **Repairs to defects by Contractors within the guarantee period were untimely or unsatisfactory.**
- **Conditions for the guarantee to stand were not met by Schools. This, coupled with delays to attend to repairs, caused the warranties to lapse.**
- **The overall effect was continued leakages experienced at Schools that affected the smooth running of classes.**

Agreements entered with both MPI and IMU for waterproofing works require the Contractor, "on satisfactory completion of the waterproofing works,... (to) submit a certificate of guarantee against leakage, defective materials and defective installation of the completed waterproofing system. Any such defects or leakage occurring during the guarantee period shall be promptly and completely attended to, including all affected work, at no additional cost to the employer." The agreements further state that, "the said guarantee shall be in effect for a period of ten (10) years from the date of the Practical Completion Certificate. The guarantee shall be signed by the Contractor and shall be submitted to the Engineer, with a copy to the Employer (for MPI commissioned works), and only to the Employer (for IMU contracted works)."

Guarantee Certificates generally express promptness on the part of the Contractor to carry out repairs and conditions to be met by Schools for the guarantee to stand. The diligent exercise of responsibilities by all parties concerned under such a warranty should ensure that buildings do not suffer from inconveniences due to leakages during the 10 year period (except for brief intervals[23]). Unfortunately, this is rarely the case. Incorrect certificates submitted and failure to attend promptly and completely to defects and leakages by Contractors caused Schools to suffer from continued leakages over long periods during the warranty term. Non-maintenance of, and damage caused to, the waterproofing membranes by Schools, also, led warranty to lapse.

During year 2012 to 2014, 38 waterproofing works in Zones 1 and 2 and amounting to some Rs 38.7 million were executed/started.

3.10.1 Non-Complying Guarantee Certificates

The contract documents do not prescribe a specific format and wordings for this Certificate. Contractors submitted Guarantee Certificates which were inappropriate. Four Certificates available in respect of works executed by MPI and IMU were examined.

The observations are as follows:

[23] Like during the time it takes to contact the Contractor and effect the repairs. At worst, mild leakages, may be experienced during these times.

- *Grand River North West GS*. Guarantee Certificate submitted by Sub Contractor was in favour of the owners and representative of the DC instead of the employer (MPI).

- *Petit Raffray GS*. The DC submitted a Guarantee Certificate "on behalf of the Ministry of Education" instead of one in favour of the employer, namely MPI.

- *Triolet SSS*. The DC submitted a Guarantee Certificate without any mention of its obligation or commitment for repairing any leakage during the 10 year period.

- *Xavier Barbe and Pointe aux Sables GS*. The Guarantee Certificate did not specify clearly whether it was in respect of defects arising from bad workmanship and materials.

All the four Certificates did not meet the contractual requirements mentioned above. Despite these discrepancies MPI and IMU accepted all the above four certificates without ensuring whether they are legally enforceable. Furthermore, no penalty or legal action that could be taken in the event the Contractor fails to promptly and completely attend to the repairs within the ten year period is specified in the contract documents.

3.10.2 Repairs to Roof Leakages Within Guarantee Period

In Zone 1, Contractors did not respond promptly to certain requests, and/or reminders sent by MPI for remedial works. Some did not respond at all. Remedial works carried out in some cases were not complete. The outcome of these was that leakages and related inconveniences continued. Examples are listed in Table 11.

Table 11 Delayed Response and Ineffective Remedial Works in Zone 1

School	Leakage and Action Taken	Contractor's Response	Effect
Simadree Virahsawmy SSS	Three Laboratories and two Classroom Blocks leaking since 2008. Several reminders, sent to contractor by MPI	Attended only one (out of four) site visit organised by MPI. Started works in March 2013 on one Classroom Block only. Existing waterproofing membranes were removed and surface left exposed. Works not completed.	Exposed surface of Classroom block rooftop imply profuse leakages. Classroom Blocks and laboratories cannot be used during rainy periods. Rain water seeping through electrical main board causing damage to equipment. In July 2014, heavy leakages in Laboratories. Due to frequent short circuits, Computer Rooms were put out of use. Inconvenience more severe during examination periods.
Dr James Burty David SSS	Leakages in Physics and Computer Laboratories since 2010. Six reminders sent to Contractor between May 2010 and April 2013	Attended only one site visit in October 2012. Remedial works started in December 2013 only.	Inconvenience caused by leakages and risk of electrocution and damages to material and equipment.
Port Louis SSS (Girls)	Leakages in Science Block started in 2013 and were still persistent in September 2014. Several reminders sent to Contractor in 2014	Contractor has not yet responded.	Leakages in Physics Laboratory have caused inconvenience to practical examinations in September 2014. Students not allowed in Biology Laboratory for practical classes.

Source: School Files

In contrast, at QEC (Zone 2), repair works were given due attention and correctly executed at its Multi Purpose Hall, in 2014.

3.10.3 Lapse of Guarantee

Conditions for the guarantee to stand include maintaining cleanliness of waterproofed roofs and avoiding tampering or damage to the waterproofing membranes. Non-observance of these by Schools has contributed to lapse of warranty. New works have had to be undertaken to replace non-performing waterproofing membranes within their warranty terms. Examples are listed in Table 12.

Table 12: Lapse of Guarantee and New Waterproofing Works

Zone/School/ Building	Original 10 Year Warranty Running Until	Reasons for Warranty to Lapse	Cost of New Waterproofing Works
Zone 1/ Triolet SSS (Boys)/ Science Block	Unknown*	No cleaning of waterproofed rooftops and tampering	Rs 768,660 (WO issued in November 2013)
Zone 2/QEC/ 3 School Blocks	2019	Waterproofed rooftops not maintained. Snapshots produced by Contractor justifying lapse of warranty showed thick layer of debris (leaves, twigs and branches) and growing vegetation on Block C, spalled concrete and plants on Block E, and tampering of waterproofing membrane on another block.	Rs 3.4 million (WO issued in December 2014.)
Zone 2/ Quartier Militaire SSS (Girls)/ Science Block	2019	Tampering of waterproofing membranes	Rs 1.23 million WO issued in 2012 for works on Science Block (along with Visual Art/Classroom and Administrative blocks)

Source: School Files

*According to MPI, the works were still under the 10 year guarantee as of 2013

3.10.4 Untimely Follow up on Repairs to Leakages and Absence of Records

When leakages are experienced at Schools, reporting same is done as illustrated in Figure 2 for intervention by MPI's DC and Subcontractor or Ministry/IMU selected Contractor.

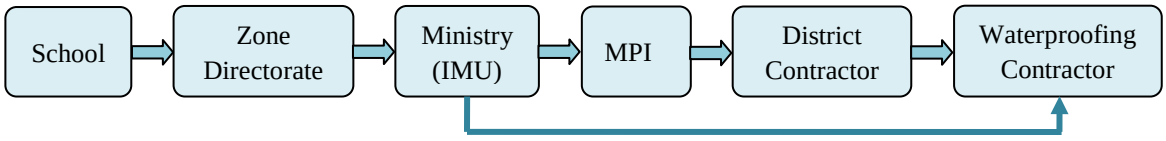

Figure 2: Reporting Leakages to Waterproofing Contractor

In all the cases examined, this process took several months and even years if one or more stakeholders in the chain did not react promptly. There were cases where waterproofing Contractors did not promptly attend to leakages despite several reminders. During this time, the leakage problem aggravates and disrupts classes, particularly during rainy months. A few examples are illustrated below.

At Pamplemousses GS (Zone 1), leakages in two classrooms were reported to MPI by IMU on two occasions – August and November 2012. A review of file at MPI revealed that no request was sent to the Contractor. In August 2014 (two years after IMU first notified MPI),

during a site visit, the classrooms were still suffering from leakages as the problem had not been attended to.

In the case of the QEC (Zone 2), the Rector informed the Zone Directorate that in several Blocks and buildings, there were leakages from roof and these were causing much inconvenience to students and staff alike, in June 2012 and again in October 2013. On both occasions, the urgency of the problem was highlighted, and a request to have it attended as soon as possible was made. No positive response came from the Zone Directorate for these two requests. It was in late January 2014 (about 1½ years later) that the Directorate informed IMU about the problem and need for urgent action. A site visit by IMU followed in March 2014, and MPI was promptly informed of situation in the same month.

Non-responsiveness of Zone (2) Directorate was, also, noted at Petit Verger GS. Leakage in a recently built Science Block at the School was notified to the Zone Directorate as early as July 2010, and again in May 2013 and February 2014. All three requests were not attended to. The Zone MU explained that it had informed the Ministry about this issue, but no evidence could be gathered at the Directorate and the Ministry to support this claim. Positive response came in May 2014 following a site visit by IMU Engineer (in the wake of the 50th anniversary of the School celebrated in July 2014). The Ministry contacted MPI to call upon the DC who constructed the building and carried the waterproofing works to attend to the leakages. As of April 2015, the leakages have not yet been repaired.

Construction of this Block for teaching Science and ICT was completed in 2010 at a cost of some Rs 1.85 million. Waterproofing works were undertaken on the roof slab, and such works are still under warranty. Owing to leakages, only half of the building which accommodates the ICT Classroom can be used. The other half where a mini Science Laboratory is housed is being used as a store because of the leakage. No Science classes have ever been held therein. Science Laboratory items purchased, thus, lie idle.

Not attending to the leakage problem, as early as possible, has cost and still costs the Ministry the inability to run Science classes for the benefit of the School's students. The benefits of money invested on construction, waterproofing works and laboratory items are not being fully derived.

The absence of records, also, affects repairs to works under warranty. Since 2008, there were leakages in Block C which had been waterproofed in 2004/2005, at S Jugdambi SSS (Zone 1). No remedial works could be undertaken as there were no records on which Contractor carried out the works still under guarantee. In December 2013, a WO amounting to Rs 541,875 was issued to the then DC to replace the non-performing membranes.

3.11 Cleaning of School Premises, Toilets and Roofs

One of the maintenance objectives is to keep facilities presentable, as well as enhancing the health and safety of the occupants through daily housekeeping and cleaning. Daily cleaning inside classrooms, offices, laboratories, gymnasiums and other facilities is ensured by School Caretakers. Toilets are cleaned daily by personnel hired and paid for by the PTA. Cleaning of other areas starting from the entrance of Schools and covering playgrounds, green areas, corridors, staircases, drains, gardens and pavements, among others, are undertaken by private

Contractors. The latter offer daily and monthly cleaning services based on agreed schedules for cleaning activities included in their contracts[24].

Monitoring is done by School management, and monthly reports are sent to the Zone Directorate. Each Head of School has to certify satisfactory delivery of service by PTA Cleaners before the MEHR can refund to the PTA monies paid for the service.[25] For Contractors, monthly returns and monitoring sheets need to be submitted by the Head of School indicating the satisfactory (or otherwise) performance of each daily and monthly cleaning activity set on the agreed schedules. Explanations for any adverse report must be given. Zone Directorates review these documents before effecting payments. Contracts allow liquidated damages at twice the daily remuneration rate payable for any service not provided on site. Any other shortcomings are addressed to the Contractor by the Directorate.

Since mid-2012, the MEHR requested all Schools to ensure the regular maintenance and cleaning of roofs.

The following observations were made:

- Liquidated damages at the appropriate rates were applied in Zone 2, but not in Zone 1, for contractual services not rendered.

- The request made by MEHR to clean rooftops did not take into consideration difficulties faced by Schools to do same. Heads of Schools visited reported that they did not have the required equipment (ladder) and School personnel were not willing to do such job. Access to rooftops and safety of cleaners were important issues preventing maintenance and cleaning of roofs.

- Roof Cleaning was included in the (monthly cleaning) contracts signed for the 22 Schools/Institutions in Zone 2.[26] This was a laudable initiative. However, roof cleaning service and its monitoring were not adequate. During a visit to QEC (one of the 22 Schools/institutions) in August 2014, access to the roof tops was not possible, but from and adjacent building, it was observed that the waterproofing membranes on one of the blocks were covered at several places with leaves and debris. The inadequate service and monitoring are best illustrated at the Directorate itself. In September 2014, the cleaning of a roof surface by the Contractor was witnessed by my officers. A plant which could have been more than two months old had grown on the waterproofing membrane and was not uprooted.

The Ministry stated that appropriate action has already been initiated for regular maintenance of roofs to prevent lapse of warranty in regards to waterproofing. It is expected that such problems will be reduced to a minimum in the near future.

However, the difficulties mentioned above in implementing the initiative taken by the Ministry and inadequate monitoring are preventing the proper maintenance of roofs.

[24] Contracts for cleaning services for premises in Schools/institutions in all Zones were awarded by MEHR in June 2012. The contracts were for a period of three years, renewable on an annual basis subject to satisfactory performance of the Contractors. In March 2014, Zone 2 Directorate appointed cleaning service Contractors for 22 Schools/Institutions not covered under the MEHR contracts.

[25] The refund relates to labour and travelling costs of Cleaners. Cleaning materials are provided by MEHR.

[26] This activity was not available in the MEHR contracts with its selected Contractors, and so, no roof cleaning was done in Zone 1 and at other than the 22 Schools/Institutions in Zone 2.

CHAPTER FOUR

CONCLUSION AND RECOMMENDATIONS

4.1 Conclusions

MEHR operates a maintenance system with a view to ensuring that Schools are kept in a usable condition and running of classes are not disrupted. However, this system does not provide for timely maintenance at least cost and of acceptable quality, at all times. This is due to major constraints and non-adherence to certain good practices within the system.

The current maintenance system mainly focuses on corrective actions. The preventive component that checks deteriorations from creeping in and ensures infrastructures are cared for early is insufficient.

The system (for the corrective part), in general, has sound processes and good practices. However, some of these are not being run in an efficient and effective manner. Planning, monitoring, execution, supervision of maintenance jobs and contract management were not always effective, and these affected the maintenance of School buildings.

At Zone level, planning, monitoring and supervision were inadequate. This created backlogs of maintenance works. Some jobs could not be fully executed and were not of reasonable quality. The Ministry is not efficient in making an optimum use of available labour resources. Productive labour hours was not fully used.

Priority lists drawn for IMU and MPI works were followed. Terms of contracts (drawn with selected Contractors) pertaining to start and completion dates, value (including Contingency amounts), and liquidated damages for late delivery were applied by both IMU and MPI. However, compliance with standards and specifications for works (included in contract documents), appropriate level of workmanship and, thereby, quality of works were not sufficiently ensured through an adequate level of supervision on most jobs.

The procurement system for materials, works and services is well established, followed and allowed resources to be acquired at the least cost. The late or non-appointment of MPI DCs, in recent years, had a negative effect. Jobs could not be carried out and created backlogs. Available funds that could be used for these jobs could not be spent and lapsed.

Guarantee Certificates for waterproofing works examined did not conform to contract requirements. Their validity could not be ascertained. Repairs to defects by Contractors, within the guarantee period, were not prompt and complete. Several Schools had experienced continued leakages that affected the smooth running of classes during the warranty periods. Conditions for the guarantee to stand were not met by Schools and this caused the warranties to lapse. Benefits of the warranties were not effectively derived. Costly new waterproofing works had to be undertaken anew at some Schools. This is not economical.

Substantial grants were paid to Schools PTA and Zone Directorates approved maintenance projects funded by same. A system for their supervision was, however, not available.

4.2 Recommendations

To remedy the above, the following are recommended:

4.2.1 Preventive Maintenance

The Ministry should move towards preventive maintenance by using existing labour resources. Checklists for all areas of a building to be inspected should be developed and Zones' MU personnel should be trained to do the inspections.

When Tradesmen are called for corrective maintenance in Schools, they should be asked to carry out inspections of the whole building. For instance, a team of Plumbers mobilised to attend to a request would easily carry a general survey of the piping/plumbing system of the whole School following the attended request. When trained to spot problems in other areas, burgeoning problems and the maintenance needs for the whole School could be identified. To be effective, Heads of Schools should receive an inspection report/checklist from the MU team for onward transmission to their respective Zone Directorates for action.

4.2.2 Periodic Review and Records on Conditions of Buildings

Zone Directorates should maintain an inventory of their School buildings and record information on their conditions. Basic data should be recorded at School level, and technical information by maintenance personnel. These should be updated with regular inspections and after effecting maintenance works. The records kept would allow management to plan and make decisions on maintenance works.

4.2.3 Budgeting

MEHR should use available funds fully for undertaking the maximum number of maintenance works at Zone level. Zone Directorates should monitor their budgetary allocations through updated financial status reports at each Infrastructure Committee Meeting. This will help to ensure funds are available on time for all prioritised jobs through appropriate requests for reallocations.

4.2.4 Maintenance Works Programme and Monitoring of Works

The Ministry should ensure that Zone Directorates submit their Implementation Programmes/Plans and Quarterly Progress reports on the prioritised works. The Plans should set time frames and define resource needs for each project. Quarterly progress reports should reflect the status of execution of the works in relation to time, cost and quality. Quarterly meetings between Ministry and each Zone should be held to monitor and follow projects. Constraints and/or deviations from plans should be identified and addressed promptly.

4.2.5 Maintenance Unit

- Proper plans of work should be prepared and approved. For each work, corresponding request rotation number and estimated time frame for attending to it should be recorded.

- For major maintenance jobs handled by the Zone MU, milestones over the period of execution should be set and constantly monitored. Any deviation should be investigated and corrected.

- The Ministry should monitor the implementation of the plan to ensure maximum use of available man hours. It may also consider having recourse to "Task Work" as described in the PRB Report.

- Monitoring and supervision of works should be adequately carried out so that tasks are fully completed to time, at reasonable cost and be of acceptable quality.

4.2.6 Supervision on IMU Works

IMU should ensure that works are executed as per contractual requirements. This can be done through effective monitoring and supervision, and adequate contract management. During the execution phase, the good practice to have proper documentation (including timely filing) on all works carried out should be adopted.

4.2.7 Roof Cleaning at Schools

The Ministry should include roof cleaning in all its cleaning contracts for Schools. This activity should be closely monitored. This will contribute to maintain waterproofing membranes and meet an important condition for a warranty to stand.

4.2.8 Supervision on PTA Funded Maintenance Works

The Ministry needs to devise a system for supervision of maintenance works carried out by PTA. Consideration may also be given for Zone maintenance personnel to assess the work done before releasing payments to Contractors. This would ensure that jobs meet a minimum standard and value for money is obtained from the grants disbursed to PTA.

4.2.9 Appointment of District Contractors by MPI

MPI should review its current time frame to complete the appointment of DCs. They need to be appointed by year end so that works can be allocated early in the following year. This will reduce delays to start maintenance works and also allow a maximum use of voted funds.

4.2.10 Supervision on MPI Works

MPI should ensure that works are executed as per requirements of the contract. This can be done through effective monitoring and supervision, and adequate contract management. During the execution phase, the good practice to have proper documentation (including timely filing) on all works carried out should be adopted.

4.2.11 Guarantee Certificate

MPI should consider drafting an adequate and enforceable Guarantee Certificate with proper wordings, setting out the responsibilities and liabilities of parties involved, to be included in contracts drawn with its selected DCs. Pending this arrangement, reporting DCs whose waterproofing Contractors have failed to promptly and completely attend to repairs under warranty to the PPO for necessary action should be considered.

MPI should seek legal advice on the validity of guarantees already submitted.

Ministry's Reply

(a) The Ministry has been raising the issue of preventive maintenance with MPI and even at the level of the Public Accounts Committee.

(b) There is a preventive maintenance strategy which includes inter-alia regular painting of schools and institutions. Regular checks are also carried out by the Technical Officers and the Engineers to detect possible spalling of concrete.

(c) There is proper planning of both major and minor maintenances to be carried out in any new financial year. In this respect, the list of these works is well established in order of priority and available at the Ministry.

(d) The backlog which may be attributed to the delay in appointment of DC is outside the control of the Ministry as DCs are appointed by MPI.

(e) There is supervision of all works allocated to Contractors by both Officers of this Ministry as client, and by Officers of the MPI as employer.

(f) When compared to the number of schools and colleges, it is obvious that the Maintenance Unit is under staffed. This Ministry is in fact making optimum use of the labour force available. However, it should be reckoned that these workers may be called upon to operate within the framework of their scheme of duties.

(g) Appropriate action has already been initiated for regular maintenance of roofs to prevent lapse of warranty in regards to waterproofing. It is expected that such problems will be reduced to a minimum in the near future.

The Ministry has taken note of recommendations which may be put in place to improve the system and appropriate actions are being taken at the level of the Ministry. Other recommendations are being discussed with the MPI.

Appendix

Assessment Criteria – Specifications for Selected Works

Waterproofing Works	➢ Contractor registered as specialist waterproofing Contractor with the MPI ➢ Preparation of roof slab surface to receive new waterproofing membrane (usually two layers), with approved materials and proper workmanship. This includes the laying of a new roof screed of approved thickness and slope ➢ No-ponding test to be performed to verify adequacy of screed slope (For IMU driven works, this test is not included as a contractual requirement) ➢ 24 hours water test to be carried out to verify leakage. The test should be verified and approved by the Engineer or representative ➢ Submit a 10 year guarantee certificate against defects
Repair of Cracks	➢ Identification and marking of areas needing crack repairs in presence of the Engineer or his representative ➢ Preparation of surface, supply and application of approved product according to Manufacturer's specifications ➢ Painting of repaired areas as required
Repairs to Spalling Concrete from Ceiling	➢ Repairs to spalling concrete as per drawings ➢ Supply of all necessary materials and plant ➢ Apply approved materials to existing reinforcement bars ➢ Apply, at spalled location of slab, appropriate and well compacted material to full thickness and levelled to existing concrete
Painting	***Concrete Surfaces*** ➢ Removal of loose paint including washing with high pressure jet and repair of minor cracks with crack filler ➢ Preparation of surface including any treatment as required by Engineer and/or specifications set by Manufacturer of approved product ➢ Supply of paint as per specifications ➢ Apply one coat of undercoat and two coats of paint ***Metal surfaces*** ➢ Removal of existing paint including cleaning ➢ Preparation of surface and supply of paint as per specifications ➢ Application of one coat of primer, undercoat and two coats hard gloss paint to internal and external surfaces ***Wooden surfaces*** ➢ Removal of existing paint, including cleaning ➢ Preparation of surface as required prior to painting works ➢ Brushing of pore sealant to surface ➢ Supply of paint as per specification ➢ Application of priming coat and two coats hard gloss enamel

continued next page

Assessment Criteria – Specifications for Selected Works

Tiling Works	***Floor tiling*** ➢ Preparation of surface to receive new tiles, including levelling ➢ Supply of all necessary materials and plant, including tile fix cement ➢ Laying of tiles of approved colour, type and thickness ➢ Filling of joints with cement based grout to Engineer's approval ***Wall Tiling*** ➢ Wall tiles as specified. Usually, coloured glazed ceramic tiles of approved manufacture, true to shape and free from blemishes ➢ Backing coat for wall tiling to be in cement and sand mortar of appropriate thickness, surface of which should be closely combed, while the mortar is still green and left for a period of 24 hours ➢ Tiles to be soaked in water for 30 minutes and bedded with an adhesive of the approved manufacture ➢ All tiles to be laid perfectly level, the joints to run straight horizontally and vertically, and to be pointed in neat cement to an approved colour ➢ Internal and external angles and rounded edges tiles to be of the same manufacture, colour and thickness as the foregoing

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