

REPORT

on the

EMERGENCY LIGHTING FAILURE

at

**GRENFELL TOWER
LANCASTER WEST ESTATE**

For

**THE ROYAL BOROUGH OF KENSINGTON & CHELSEA
TENANT MANAGEMENT ORGANISATION LTD**

JOB REF: PW/HMK/8803 (CS/005351)

MAY 2005

SA/6

**CAPITA SYMONDS
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1. INTRODUCTION

The London Borough of Kensington and Chelsea Tenant Management Organisation (TMO) are responsible for the management of the residential element of the Borough's portfolio of properties.

The TMO experienced problems with the emergency lighting installation at Grenfell Tower, which is a part of the Lancaster West Estate and received complaints on their response from the Lancaster West Estate Management Board (EMB)

The TMO appointed Capita Symonds to prepare a report that:

- Identified the problems and issues arising.
- Provided a commentary on the actions taken.
- Provided conclusions and recommendations that should be implemented to minimise the risk of the problems identified recurring.
- Compares recommendations made with the actions taken to date by the TMO.

The TMO have provided meeting notes, reports, certificates, schedules and correspondence relating to the problems occurring, whilst interviews have been held with representatives of the TMO, EMB and Seeboard Contracting Services (SCS), the maintenance contractor.

A schedule summarising the documentation issued has been provided as **Appendix 1**

This report explores the issues on an elemental basis, draws conclusions on each of these issues and provides a series of recommendations that should be considered for inclusion in the TMO's future management arrangements.

Capita Symonds would like to thank all of the respective organisation's representatives who gave their time to assist in the production of this report.

2. SUMMARY

Capita Symonds was appointed to undertake a review of the problems with the emergency lighting system installed at the Grenfell Tower, Lancaster West Estate. The review was undertaken by examination of the correspondence, emergency lighting certificates plus their attached schedules provided by the TMO and conducting interviews with all of the relevant organisation representatives. A summary of observations, comments, conclusions and recommendations are outlined in detail in Section 4, however it has been concluded that no clear singular cause for the defects has been identified. It is believed that the specification requirements were correct but the seriousness of the incidents have increased over a period of time due to:-

- The inadequate management of the contract by the contractor
- The lack of suitable checking / auditing procedures by the TMO
- The lack of suitable communications between the contractor and the TMO

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The lack of suitable communications within the TMO

Failure to acknowledge the importance of undertaking urgent remedial works by both the TMO and the SCS.

The lack of communications between the TMO and the EMB.

The inadequate installation standards of the contractor

The lack of adequate strategy planning by the TMO, suitably supported by the contractor

It has also been concluded that all aspects of the contract conditions and management require extensive review in order that the TMO can be 'proactive' in its approach and be able to develop a specification that reflects the skills and resources available to appoint and manage a suitable contractor.

In view of the current contractor's performance, the TMO should review whether SCS are suitable to continue with the contract, or whether they should even be requested to submit a bid for the new specification, which it is understood is currently being prepared by the TMO.

Health and Safety issues have been identified that need to be corrected for all future schemes, in terms of the production of Risk Assessments / Method Statements prior to commencing repair / installation works.

During the course of the investigation, it has been noted that there may be a significant number of power failures occurring in the Lancaster West area whose anticipated and actual durations are greater than the predicted three hours provided by the emergency lighting system. In this event the emergency lighting system is not sufficient to cater for the problem with current design arrangements, therefore it has been recommended that a separate investigation is undertaken to determine

The actual number and duration of power failures that have occurred,

Whether the power failures are likely to re-occur for extensive periods

The options available to overcome the potential failures

The capital and maintenance costs of the options identified

The TMO have noted the recommendations made in this report and are in the process of preparing an Addendum that is to be read in conjunction with this report. The Addendum outlines the TMO'S responses to the report recommendations in terms of actions already taken, those in progress and those yet to be implemented.

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3. BACKGROUND

The Grenfell Tower houses approximately 400 residents in 120 dwellings over 20 floors. The landings and staircases, where the emergency lighting system is situated, receive no natural lighting therefore it is vital that suitable lighting to the tower communal areas is available 24 hours/day, in the event of an electrical power failure to the property. It is understood that the emergency light system was installed in 1992.

SCS are responsible to the TMO for carrying out formal bi-annual emergency lighting inspections in accordance with the TMO's specification, the British Standard Emergency Lighting Code of Practice recommendations and Health & Safety requirements. An intermediate check was also required at the intervening quarterly intervals.

SCS are required to provide Inspection Certificates, in a format approved by the Electrical Contractor's Association (ECA) and supporting schedules to indicate that the system is working satisfactorily as a part of their formal inspections, and that the system complies with the British Standards and the Code of Practice.(BS EN 18238 and BS 5266) recommendations, however the February 2004 schedule indicated a 66% failure rate. The issue of this Certificate by the SCS caused the EMB to question the reason for the significant failure and to request sight of previous certificates, which was not readily forthcoming.

Subsequent examination of the January and June 2003 Schedules indicated that the system was 'Satisfactory', however no Certificate was issued for a September 2003 inspection, although the supporting schedule was provided. The latter Certificate's Schedules were not completed correctly in that a number of the luminaries had no comments made on whether they were satisfactory or not. Comparison with the Schedules issued in February 2004 showed a remarkable correlation between the luminaries that had failed and those that did not have a comment against them in the September 2003 schedule.

Measures to replace the defective luminaires were put in place by the contractor on behalf of the TMO, however various accusations were made by the EMB on the TMO and contractor's performance, including slowness in response to replace the defective luminaires and a lack of communication by the TMO. This problem was exacerbated by the failure of the power supply to the Tower in May 2004 during which a significant number of luminaires failed.

The TMO subsequently instituted a borough-wide emergency lighting replacement programme and was in the process of replacing the luminaries in the Walkways adjacent to the Tower when a similar problem of luminaire failure occurred. The cause of this problem has not been explored as a part of this report, however it is assumed that the technical cause of the problem is similar to that which occurred in the Grenfell Tower.

Capita Symonds were appointed to prepare an independent report on the issues arising and make recommendations on avoidance of similar problems re-occurring.

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4. SUMMARY OF COMMENTS & RECOMMENDATIONS

4.1. ROLES & RESPONSIBILITIES

The primary responsibility for the problems occurring are the contractor's poor administration, communication, management procedures and the quality of installation works, however the TMO have a responsibility to the Borough, the public and the residents of Grenfell Tower, to ensure that the contractor complies with the specification requirements and provides a duty of care to the residents. Unfortunately this objective has not been demonstrated and it has been concluded that a considerable effort will be required to amend the culture and procedures to ensure effective management.

It is, however, believed that the lessons learnt are clear to the senior levels of management of the TMO and steps are being put into place to ensure efficient and effective management in the future.

4.2. CERTIFICATES

There were numerous discrepancies with the Inspection 'Compliance' Certificates and the attached schedules issued by SCS; the discrepancies have been brought to the attention of the contractor and verbal re-assurances have been received from SCS that corrective action has been taken by the contractor particularly with respect to staff training.

Recommendations

Written assurances should be received by the TMO that the appropriate corrective actions have been taken with respect to;

The correct completion of Certificates

Scheduled inspection periods

Revising the test reports into an appropriate reporting format

Training of engineers

Reporting, escalation and management procedures

These actions should be complete to the TMO's satisfaction before the contractor is permitted to continue undertaking the planned maintenance and testing procedures; the agreed revised procedures should be audited throughout the duration of the contract. In view of the serious lapses in Certification, communication and installation standards, the TMO should review whether to continue with the employment of SCS as the maintenance contractor.

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It is also recommended that the contract conditions be changed to entitle the contractor to either

Refuse to provide a Certificate until all remedial works identified are undertaken

Issue a Certificate of Compliance, subject to the condition that any remedial works identified are completed by a certain time and checked to ensure that the works have been completed satisfactorily

Ensure that the contractor is required to undertake all works necessary for compliance with the BS requirements as an inclusive part of the contract.

The latter proposal is the preferred option, supported by regular and ad-hoc audits. Key Performance Indicators (KPIs) and Service Level Agreements (SLAs) should be introduced to penalise the contractor for unacceptable levels of 'failures' or insufficient levels of lighting for prolonged periods.

Comment

It should be noted that the TMO have commenced reviewing the format of the documentation of the Schedules and Certificates.

4.3. RISK ASSESSMENTS

4.3.1. TMO Management Risk Assessment

It is believed that the significant failure outlined in the February 2004 Schedule and the poor communications between the EMB and the TMO at the time of the incident obscured the fact that a warning had been given that the power failure could have been in the order of five hours, in which case the batteries would have definitely expired and left the Tower 'legitimately' without lighting of the communal areas.

The receipt of the warning should have led to a management escalation procedure being implemented that advised the occupants of the failure and the preferred method of evacuating the building, should it be necessary. It must be noted that Lancaster West has experienced three electrical power failures within a year, one of which was of 24 hours duration. Verbal reports indicate that the area is subject to frequent power failures.

Recommendations

A joint TMO /EMB Risk Assessment should be undertaken to consider;

Frequent power failures have now become a reality (a check should be made with the Utility supplier on actual and potential power failures and durations)

Power failures may exceed the anticipated life of the batteries

The potential effect of a power failure occurring in the early hours of a morning,

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The fact that occupants may not be aware that a power failure has occurred for a significant period,

The management arrangements required to warn the occupants of the power failure and implications

Frequencies of inspections

The development of a plan of escape without the use of the emergency lighting system

An option analysis on the provision of the technical solutions available (see Section 8.2 for a preliminary view on the options available)

Comment

The issue of the Emergency Lighting Certificate and the attached Schedule in February 2004 caused the TMO to commence the replacement of the emergency lighting system in Grenfell Tower and a programme of replacing the emergency lighting systems throughout the Borough immediately with a five year replacement programme.

4.3.2. Contractor Risk Assessment

A Risk Assessment was not undertaken by the contractor to determine the implications of replacing the majority, if not all of the installed luminaries. The Risk Assessment should have clearly identified that the areas where fittings were replaced would be subject to limited, or no emergency lighting, whilst the replacement work was carried out. This information should have been relayed to the EMB, via the TMO in order that alternative management arrangements or temporary technical solutions could be put in place to provide cover whilst the works were carried out.

Recommendation

The TMO should ensure that a Risk Assessment and Method Statement are provided by the contractor and agreed with the EMB prior to any works affecting system integrity are carried out.

4.4. ASSETS MANAGEMENT

It appears that there was not an integrated Life Cycle Plan, Asset / Condition Register in place that would enable a Planned Maintenance or Replacement Schedule to be managed correctly. In addition there did not appear to be a system of monitoring failure / replacement rates of batteries / inverters per annum that could be used as a management tool for a trend analysis and an indication of the optimum time for battery replacement.

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Recommendations

A comprehensive asset register, condition survey report and Life Cycle Cost plan should be developed and maintained such that the personnel involved with the planned maintenance will be aware of the anticipated life, actual condition and replacement costs at all times.

A system of monitoring reported defects and remedial actions taken should be in place such that a trend log of repairs and costs can be established

Comment

It is believed that an improved asset register is being produced by the TMO to be used in conjunction with a revised specification.

4.5. COMMUNICATIONS

The communications between the contractor, the TMO and the EMB and within the TMO itself appears to be poor and needs significant improvement if a serious incident is to be avoided. The extensive correspondence and meeting notes provided is basically a record of the EMB attempting to determine the cause of the alleged faults, the remedial actions being taken and the responsibility for the problems occurring. The TMO responses to the requests and the incident unfortunately did not reflect any urgency or a need to inform the EMB of the actions being taken or a timely and realistic assessment of the situation occurring.

Recommendations

It is believed that a formal communications system should be put into place whereby

The TMO and the EMB formally, and regularly, meet to discuss the maintenance issues and the actions that arise from those meetings.

Copies of all relevant ECA Inspection Certificates are forwarded to the EMB to provide re-assurance that the maintenance checks are being carried out correctly at the correct intervals.

Formal and regular reviews are held with the maintenance contractor.

The TMO develop a culture of positive communications such that critical issues arising are escalated within the organisation itself and promote joint team working with the EMB who are effectively the client body.

4.6. TECHNICAL MANAGEMENT

It is uncertain how much of the system had been repaired or replaced at the time of the power cut (6th May 2004), although verbal reports indicated that a substantial number did not come on at all. However it appears that the power failure occurred for a period of approximately three hours i.e. the design duration of the batteries, therefore the alleged 'substantial failure' of the system was probably due to a combination of; -

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Batteries simply being drained of power due to the duration of the power failure.

The original defective units still being in place

Units that had been repaired / replaced incorrectly

No substantive cause has been identified for the significant failure, but it was acknowledged by the contractor that some of the batteries or inverters had been fitted or rewired incorrectly. The contractor's view was that six of the units were defective, whilst the TMO's opinion was that twenty were defective.

It is also believed that the fittings were not thoroughly tested prior to being put into use or 'handed over' to the TMO, nor was a Certificate provided to confirm that the fittings had been installed and tested correctly.

The management and audit role of the TMO particularly in the period up to the May '04 power failure incident did not prove to be effective in that it appears that the Inspection Certificates were not issued to the TMO immediately after the testing had taken place and/or the TMO did not; -

Ensure that a maintenance routine procedure was in place to identify when Certificates were due and received

Check the status of the Certificates

Identify that the emergency lighting system was due for complete replacement and either replace it before problems occurred or undertook more frequent checks to ensure compliance to minimise risk

Ensure that there were adequate spares available for immediate part replacement

'Trend' monitor the extent of battery / inverter replacements.

Recommendations

It is recommended that a procedure be put into place that continuously manages the inspection and Certification process that takes into account the issue itemised above.

4.7. HEALTH & SAFETY ISSUES

The principal Health & Safety issue is the fact that the system was known to be substantially defective from the time of the February tests (26th February 2004) until mid May 2004, when the defective units were replaced. It is also highly likely that the system was substantially defective from the 22nd September 2003 and to have deteriorated from the June 2003 inspection until the September inspection. i.e. periods of;

15th June 2003 – 22nd Sept 2003 - 14 weeks (15th June estimated date)

22nd Sept 2003 – 26th Feb 2004 – 22 weeks

26th Feb 2004– 15th May 2004 – 7 weeks (15th May estimated completion date)

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It can be seen from the above that the system was substantially ineffective for a period of between 29 to 39 weeks which is clearly unacceptable, bearing in mind the potential risk to the residents and members of the public that may be in the building at any one time.

Prior to the commencement of the repair works, SCS should also have provided Method Statements and Risk Assessments that outlined their proposals for carrying out the works and the likely risks that could be involved

4.8. CONTRACT CONDITIONS

Whilst a copy of the original contract and the subsequent extensions to the contract have not been seen, it is understood that the original contract requirements were extremely onerous (and expensive) hence the contract has been gradually amended over time to a rolling one year contract extension with SCS, the originally appointed contractor that more realistically reflects the TMO's requirements.

The current version requires SCS to undertake an hourly and a three hourly inspection and test on a rotational basis every six months, to ensure that the lighting is capable of remaining 'on' for one and three hours respectively when the electrical power serving the lights is 'off'. The contract apparently also required the contractor to undertake bi – annual checks at quarterly intervals during the intervening months. The contract requires SCS to check that every emergency lighting luminaire;-

Is capable of providing suitable lighting for either a period of one or three hours (subject to the test period):

Is clean

Has a working tube and replace it if a defect is noted

Is correctly labelled

In the event of failure of the batteries / inverters, SBS are required to notify the TMO and request orders for replacement units.

Inspection results have been provided for January 03, June 03, September 03, February '04, May '04 tests, however no reason has been established for the contractor carrying out the 'formal' tests in September '03.

It is uncertain whether a report of some form is required for the intermediate tests however It is highly unusual for contractors to undertake additional formal tests without additional payment.

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Comment

The contract conditions enable the SCS to obtain recompense for changing any defective items of equipment (other than bulbs), therefore there is no financial incentive for failing to identify or report a failure.

In fact the emphasis of this type of contract is the reverse, in that Contractors are frequently known to seek to justify an early change to:

Obtain additional funding.

Reduce maintenance costs.

The above comment is particularly true of a system that is allegedly twelve years old, as reported in one of the May 2004 schedules.

Discussions with the TMO indicated that the current specification causes extensive paperwork that significantly reduces the time available for audit and general contract management therefore a revised version is in the process of preparation.

Recommendation

The Contract should be amended to require the contractor to rectify any defects as a part of the contract prior to issuing a Compliance Certificate with the costs being absorbed within the budget. SLAs and KPIs with penalty clauses and random checks should be introduced as a part of the contract to ensure that the system is maintained at optimum efficiency.

5. ANALYSIS OF EMERGENCY LIGHTING CERTIFICATES DATA

The purpose of providing an Emergency Lighting Certificate is to provide reassurance to the occupants of the relevant property that the lighting is fully effective at the time of testing, and likely to be fully effective if a power failure occurs, however there are a number of issues with the certificates provided (see **Appendix 2** for a full summary of the certificate data and related schedules). A typical Certificate has been attached as an example in **Appendix 3**

The Certificates and associated schedules provide a simple 'tick sheet' of items, therefore enabling compliance and failures to be simply recorded.

5.1. CERTIFICATE DATA

A summary of the responses provided on the Certificates is shown in the Table over

It should be noted that signature of the Certificates indicates **compliance** with the various Emergency Lighting British Standards i.e.; BS 5266, 1838 and the various Codes of Practices and that all of the Certificates provided indicated the highest standard achievable i.e. 'Satisfactory'; all certificates provided were 'signed'.

Analysis of the responses listed over shows that the majority of the key information requested has not been recorded satisfactorily. The following has particularly been noted:

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The serial numbers of the Test Certificates are not sequential and therefore it is illogical how the sequence has developed, i.e.

DATE	NO.	ENGINEER
January 2003	2857	D Weymouth
June 2003	31830	I Murray
September 2003	No Certificate Provided	S. Bishop
February 2004	22492	I Murray
May 2004	31836	I Murray

The Feb 2004 Certificate clearly indicates that the system is 'satisfactory', yet the emergency lighting system clearly failed.

All certificates provided indicated that the systems were satisfactory, although there are 'unsatisfactory' conditions outlined in the attached schedules, e.g. the unsatisfactory labelling of a number of luminaries outlined in the Schedules, "no information being available for correct battery replacement".

Comment

A satisfactory answer has not been provided by SCS to the question of the numbering of the Certificates, other than to suspect that the engineers may have been using different pads.

It is possible that the engineers believed that the issue of the Certificates indicated that the system had been tested in accordance with the British Standard recommended procedures rather than the system had been tested and met the required standards, hence the issue of the 'satisfactory' certificates. However this response does not explain why supporting documentation with recommendations for repairs has not been provided with any of the Certificates

No comment has been received on the deletion of the questions that clearly required an adequate response to ensure that all aspects of the test procedures were adequately carried out.

It is also understood that the Certificates were 'batch' delivered to the TMO for complete areas of work undertaken, hence there could be a significant delay between the tests being completed and the relevant Certificated being forwarded to the TMO, however it is believed that this practice has now been stopped and the Certificates are forwarded by property immediately on completion of the inspections..

The above issues have been raised with the Contractor and assurances have been provided that their procedures have been, or are in the process of being, amended.

The principal recommendations are provided in the Summary (Section 4).

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Certificate Questionnaire	ELP 2857 6/1/03	ELP 31830 7/6/03	22/9/03	ELP 22492 26/2/04	31826 26/5/04
Certification	Compliant (M1)	Compliant (M3)	NO CERTIFICATE PROVIDED	Compliant (M3)	Compliant (M3)
Variation	None	None		None	None
Comment	None	None		None	None
Results of Inspection					
Entries in Logbook?	Yes	Deleted		Deleted	Deleted
Record Drawings Available?	No	Deleted		Deleted	Deleted
Record Drawings Correct?	Not Answered	Deleted		Deleted	Deleted
Signs Correctly Positioned?	Yes	Deleted		Deleted	Deleted
Sign Details Correct?	Yes	Deleted		Deleted	Deleted
Self-Luminous Signs Need Changing?	No	Deleted		Deleted	Deleted
Luminaire Correctly Positioned?	Yes	Yes		Yes	Yes
Correct Lamps Installed?	Yes	Yes		Yes	Yes
No Change to Layout/Décor?	No	No		No	No
Installation Generally Satisfactory?	Yes	Yes		Yes	Yes
Cat and Operational Voltage Clearly Marked?	Yes	Yes		Yes	Yes
Luminaires Clearly Marked for Correct Lamp?	Yes	Yes		Yes	Yes
Information Available for Correct Battery Replacement?	Yes	No*		No*	No*
Last Inspection/Test Certificate Satisfactory	Not Answered	Deleted		Deleted	Deleted
Charging Arrangements Satisfactory?	Yes	Yes		Yes	Yes
Charger Device Operate Satisfactorily?	Yes	Yes		No*	Yes
Self Contained Luminaires Operation after Operation for Rated Duration?	Not Answered	Yes	Yes	Yes	
Battery Charger Functioning after Restoration of Normal Supply?	Not Answered	Yes	Yes	Yes	

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5.2. CERTIFICATE SCHEDULES DATA

The schedule below outlines the defects that were not highlighted correctly on the schedules attached to the certificates.

None of the schedules attached to the certificates were completed correctly.

The January 2003 schedule indicated that 5% of the luminaires were not labelled.

The June 2003 schedule indicated that 16% of the luminaires were not labelled.

The labelling notation provided in June was not consistent with the previous schedule.

The September 2003 schedule did not have a certificate attached but all of the luminaires tested appeared to be now labelled.

The February 2004 schedule indicated that 16% of the luminaires were not labelled.

The only comments reported on the schedule were as follows:

- No test override switches (Jan 03)
- .
- F – Failed immediately (Feb 04)

The (Jan '03) comment above regarding test override switches is accurate, as no switches were installed at the time of testing, however the September 2003 schedule indicates that the ground floor has been provided with five key switches, but they do not appear on the Feb '04 schedule or the May '04 schedules.

The light output is listed as 28W on the June 2003 and February 2004 schedules, however this is the notional power output of the 'tube' and does not indicate whether the lighting levels within the space is satisfactory or not.

Comment

In view of the above comments, it is believed that the certificates have little validity. The issue has been raised with SCS and assurance has been received that he is in the process of changing the schedule format and his procedures for completing the schedules.

The principal recommendations are provided in the Summary of Comments & Recommendations (Section 4)

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5.3. MANAGEMENT ISSUES

Analysis of the documentation provided indicates that the first time that the TMO was aware of, and responding to the condition of the emergency lighting was some three weeks, (26/2/04 to 'mid - March?) after the inspection had taken place, and nine weeks had elapsed before the replacement works commenced (1st May?) although there is correspondence indicating that the contractor was on site from the 12th April.

It is implicit from the documentation provided that action was taken within the TMO to remedy the problem without prompting from the EMB, however the importance of communicating this information to the EMB was not appreciated.

This problem with communications with the EMB was compounded by the inability of the TMO to immediately produce the two previous year's Certificates when requested to do so by the EMB.

The cost of replacement batteries / inverters are borne directly by the TMO therefore it is assumed that the cost of an unanticipated replacement at least 66% of the emergency lighting system at Grenfell Tower at a cost of say £15,000 would be subject to a specific report to the TMO Management Board with supporting reasons for the failure, none of this information has been provided to date, nor the timing of the approval(s).

The following questions arise that have not been satisfactorily answered; -

Why did the SCS immediately report directly to the EMB after the 'failure' report when their client was the TMO?

If it was deemed necessary to report directly to the EMB following the February '04 inspection, why had the SCS not similarly reported the reason for the failure to provide a Certificate, or the inadequately completed schedules after the September 2003 inspection?

Were all of the Certificates submitted to the TMO at the appropriate times, or at all without prompting?

Assuming the Certificates were forwarded, at the appropriate time, why was no action taken on the quality of the Certificates or the attached schedules, by the TMO?

Were any checks made to ensure that the contractor held sufficient spares for replacement of what were known to be 'old' / obsolete units?

Was a system in place to recognise that the system was beyond its normal maximum recommended working life of seven years and that imminent replacement was likely?

Was there a system in place to identify increasing failure rates e.g. increasing number of battery/inverter replacements over a given period of time, and take remedial action?

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Is there a system in place to recognise that Inspection Certificates have not been provided by the due dates and a relevant procedure adopted should they not be provided by the due date?

Was there an appreciation of the importance of responding to the allegations and ensuring a timely response?

Was any person identified as being the responsible person to respond to the comments made by EMB?

Unfortunately the lack of authoritative and positive responses to the above indicates that the issues were not adequately considered

The principal recommendations are provided in Section 4

5.4. TECHNICAL ISSUES

There are a number of technical issues, outlined below, that have not been adequately addressed or documented, however it should be noted that a number are also identified as management issues but are repeated for completeness i.e.; -

Why was there a significant failure of the lighting over a 3 or 8 month period i.e. June 03 – Feb 04, depending on the view point of the accuracy of the September '03 Certificate?

The system was known to be approximately 12 years old, the normal life of this type of system is approximately 4 – 7years, however the contractor does not identify that replacement parts are difficult to obtain / obsolete or make recommendations in any of the report schedules.

There did not appear to be sufficient spare parts or units held by the contractor or the TMO.

It is not understood how the replacement luminaries were wired up incorrectly by 'competent' electricians, however It is understood that the wiring problems were 'internal' within the old style units, rather than external wiring by the contractor'; were these defects reported to the supplier and were the units replaced as a matter of urgency?

No tests on the replacement luminaries were undertaken and the results documented

Were tests witnessed by representatives of the TMO of the initial Tower and final luminaire replacements?

Were appropriate Certificates issued at the time confirming that the installation had been correctly undertaken and Certificates issued accordingly?

Unfortunately the lack of authoritative and positive responses to the above indicates that the issues were not adequately considered.

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The principal recommendations are provided in the Section 4)

5.5. HEALTH & SAFETY

5.5.1. Risk Assessments / Method Statements

There are various areas of concern in that no Risk Assessments / Method Statements were prepared by either the contractor or the TMO that recognised that the residents and members of the public, were continuously at risk whilst there were insufficient working luminaries.

It is believed that the contractor was aware that the replacement batteries would require approximately 48 hours to totally recharge, however it appears that no Risk Assessment or Method Statement was provided by the contractor to formally advise the TMO or the EMB that areas of the emergency lighting would not be available during the replacement works and that temporary technical facilities or managerial procedures should be in place, prior to commencing work to ensure the property could be evacuated without incident.

It is understood that the works were undertaken on a floor by floor basis therefore any particular floor would not be able to maintain a three hour service for a period 48 hours plus actual replacement time say 8 hours, i.e. a period of 56 hours, which is clearly unacceptable without prior agreement with the EMB, TMO or any alternative management or temporary technical solution being provided.

Recommendation

Risk Assessments and Method Statements should be compulsory for all works that can affect the safety of the public, occupants or staff of the Royal Borough of Kensington & Chelsea. The contractor's Risk Assessments and Method Statements should be agreed with the EMB and the TMO representatives, in all instances, prior to the works commencing.

The principal recommendations are provided in Section 4

6. FUTURE STRATEGY

Irrespective of the maintenance and communications outlined previously, a major issue has been identified in that the predicted battery life may not be sufficient to occupy or vacate the building in a safe manner, therefore alternative arrangements should be subject to a separate Option Appraisal that includes; -.

Management Arrangements

In principle, it should not be necessary to manage / audit the contract on a day to day basis, but it is believed to be essential in the current economic climate to ensure that the client is receiving the services specified. To achieve this objective, it is necessary to devise simple audit and communications procedures that will enable the TMO to verify the contractor performance standards in terms of meeting agreed programmes, communications, management, administration, technical services, costs, quality,

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interpreting the resident's concerns and providing appropriate responses at the appropriate time to the relevant representatives.

A concierge is provided at Grenfell Tower with a 24 hour service, therefore the staff must be fully briefed on the actions to be taken under power failure conditions i.e. whether to advise the occupant that a power failure has occurred, whether to vacate, where to vacate to, and the means of lighting the route to the allocated collection point. It must also be appreciated that the resident's apartments may also be in complete darkness and whether alternative arrangements have to be made for disabled people.

Extending the life of the luminaire batteries

Research should be undertaken to determine whether standard batteries are available for a life exceeding three hours and a decision made on predicted 'down' times of the electrical supplies.

Central Battery System

Consideration should be given to the provision of a central battery supply that is continuously charged whilst the mains are active and are activated on mains failure. As with the 'local' enlarged battery proposal above, a decision would have to be made on the predicted requirements. The capital cost could be significant on changing to this type of system for it will also require additional maintenance and testing.

Standby Generator

A gas or oil fired standby generator could be provided which could adequately cope with a power failure, however it is anticipated that there would be extensive discussions on the sizing e.g., should the generator be sized purely for the emergency lighting, should it be increased to cater for minimal lighting requirements in the dwellings, should minimal power supply be provided to the critical items of engineering plant e.g. heating and hot water boiler control systems and pumps?

An oil fired standby generator will require substantial space for fuel storage supplies, will be expensive to install and maintain and will require regular testing. Noise and exhaust termination points may also be an issue.

Dwelling Emergency Torch

A radical and relatively inexpensive approach would be to provide a large torch in each dwelling with rechargeable battery that is permanently connected to the mains by a fused spur. On mains failure the occupier could use the torch to move safely around his / her apartment or use it to vacate the building. Once the system is installed it would be the occupier's responsibility to ensure that the torch remained in place in a useable manner.

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7. RESOURCES

During the course of discussions, the adequacy of the TMO resources was raised as a factor in the defects occurring. It is believed that the requirements of the current specification is labour intensive i.e. it requires a great deal of time in undertaking audits across the Borough, preparing and checking orders against works carried out rather than spending skilled resource time on developing and managing maintenance / replacement strategies. However the TMO must provide the appropriate resources to ensure that the required service is provided.

A radical approach is required to overcome this problem, which may require a greater emphasis on the contractor taking more responsibility and a professional approach to carrying out his work. The TMO would effectively 'trust' the contractor to carry out the works in accordance with the specification, but coming down very hard on the contractor if failures are identified.

The above objective can be achieved by the introduction of 'output' rather than 'Input' specifications, SLAs and KPIs to measure the performance and achievements of the contractor and a carefully developed monitoring process. By careful negotiations and developing a trust between the three parties, it may be possible to develop an incentive scheme whereby the contractor receives an enhanced payment if he can assist in developing consistent quality standards at a lesser overall cost to the TMO.

8. CONCLUSIONS

The conclusions and recommendations are outlined on an elemental basis throughout the report and summarised in Section 3, therefore it is not believed to be necessary to replicate this information at this point.