Engineering Recommendation G104
Issue 1 2019

Guidance to the Assessment and Management of Legacy Rising and Lateral Mains in Multiple Occupancy Buildings
First published March 2019

Amendments since publication

<table>
<thead>
<tr>
<th>Issue</th>
<th>Date</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>
## Contents

References / Foreword ........................................................................................................ 4
Introduction .......................................................................................................................... 5
Definitions ............................................................................................................................. 6
1 Scope .................................................................................................................................. 8
2 Purpose ............................................................................................................................... 8
3 Assessment of Ownership and Responsibility ............................................................... 8
   3.1 Ownership Boundary ................................................................................................. 8
   3.2 Responsibility ............................................................................................................ 8
4 Risk Assessment Considerations ....................................................................................... 8
   4.1 Risk Assessment ........................................................................................................ 8
   4.2 Asset Risk ................................................................................................................ 9
5 Prioritisations of Interventions ....................................................................................... 9
6 Intervention and Mitigation Management ......................................................................... 9
Appendix A ......................................................................................................................... 11
Appendix B ......................................................................................................................... 17
Appendix C ......................................................................................................................... 18
Appendix D ......................................................................................................................... 19
References / Foreword

This Engineering Recommendation (EREC) is published by the Energy Networks Association (ENA) and comes into effect from 6th March 2019. It has been prepared, in conjunction with the Rising and Lateral Mains Working Group, under the authority of the ENA Head of Engineering and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG).
Introduction

Following an ENA SHE Committee review (held on 13th December 2017) issues were identified concerning the operation of networks within and adjacent to multiple occupancy buildings, particularly the management of rising and lateral mains (RLM) within such buildings.

Discussions highlighted common issues across the companies relating to ownership, inspection and maintenance responsibilities. ENA Electricity Network Futures Group directed the creation of the Rising and Lateral Mains Group to develop guidance and an agreed approach to managing these installations.
Definitions

Building Network Operator (BNO)

A Building Network Operator (BNO) is defined in ENA ER G87 as “The organisation that owns or operates the electricity distribution network within a multiple occupancy building, between the intake position and customers' installations. The BNO may be the DNO, another licensed distributor or a third party exempt from an electricity distribution license (e.g. a facilities management company)”. This definition aligns with the definition detailed on the Building Network Operator website.

A BNO may be a building owner, landlord, developer or similar function in control of a building infrastructure at any given moment. A BNO may appoint a competent 3rd party to undertake the required obligations.

An IDNO, as defined in the Electricity (class exemption from the requirement for a licence) Order 2001, may undertake a BNO function.

A BNO requires a distribution license unless it manages distribution of less than 2.5MW load or generation of less than 10MW; amongst other criteria (refer to the Electricity Order 2001).

Building Network / BNO Network

The network comprising cables or bus-bars, switchgear / fusegear and any associated ancillary equipment between the Intake Position and Customer's meter.

Building Network agreement

A detailed document specifying which body; DNO, Supplier and BNO is responsible for each component of the Building Network.

Customer

The owner, occupier or operator of a premises, each having its own Metering Point, housed within a larger building. Refer to the ownership boundary details in Appendix A.

Customer's Installation

The electrical installation within and servicing an individual Customer’s Premises and including, where applicable, Customer-owned service cables.

Distribution Network Operator (DNO) / Independent Network Operator (IDNO)

DCode definition: The person or legal entity named in Part 1 of the Distribution Licence and any permitted legal assigns or successors in title of the named party.
Intake Position

The location within the building where the boundary between the DNO’s network and the BNO Network or Customers’ Installations occurs. Refer to the ownership boundary schematic details in Appendix A.

Meter Point Administration Number (MPAN)

A 13 digit reference used to uniquely identify every electricity supply point in the country.

Multiple Occupancy Building (MOB)

For the purposes of this document a MOB is any single residential building that has been subdivided into more than one premises, for example flats (including conversions). It includes communal areas (if any).

Site Responsibility Schedule

A detailed document specifying which body; DNO, Supplier and BNO is responsible for each component of the Building Network.
1 Scope

Arrangements for new electricity connections to premises that comprise whole or part of a Multiple Occupancy Building (MOB) are specified in ENA Engineering Recommendation G87 first issued in January-2010. The details and guidance contained within this document, “Engineering Recommendation G104 Guidance to the Assessment and Management of Legacy Rising and Lateral Mains in Multiple Occupancy Buildings”, apply to buildings completed before January 2010.

2 Purpose

The purpose of this EREC is to provide guidance to ENA members on:

1. boundaries and limits of ownership and responsibility,
2. the development of risk assessments for mitigation and prioritisation purposes and
3. intervention and mitigation measures available for consideration to ensure compliance with legal and HSE requirements.

3 Assessment of Ownership and Responsibility

3.1 Ownership Boundary

The extent of the DNO network is dependent on the configuration of the electrical equipment in the building. Refer to the ownership boundary details in Appendix A.

3.2 Responsibility

Where a DNO provides a connection to a BNO, the DNO shall enter into a connection agreement with the BNO. This Connection Agreement shall include a responsibility schedule that defines the ownership, maintenance, operation and control responsibilities of the electrical equipment at the boundary between the DNO and the BNO.

Where there is a BNO agreement in place the BNO shall be responsible for the operation, maintenance and management of those assets beyond the DNO boundary.

Where no agreement is in place, the BNO is to be identified and made aware of their responsibilities. The DNO/IDNO shall actively seek, so far as is reasonably practicable, to agree a Site Responsibility Schedule.

Where a BNO cannot be identified and/or an agreement cannot be established it is recommended that the DNO assess the ongoing risk and, where appropriate, take further steps. These could include taking responsibility of the assets within their own asset registers or considering the disconnection of the asset under grounds of safety.

4 Risk Assessment Considerations

4.1 Risk Assessment

A risk assessment shall be carried out on those assets for which the DNO is accountable. A risk assessment shall be carried out on the BNO system where the DNO is the BNO through agreement or design. A template example is shown in Appendix B of this document and EREC104 Appendix B.

The risks arising from RLM installations that may be in a poor condition impact on:

- Operators working on the installation. They may be exposed to a risk of shock, electric arc, excessive heat or destructive equipment failure.
• Members of the public and residents in a building who may be exposed to risk in the event that a RLM failure results in a fire.

In order to avoid having to frequently update the risk assessment the DNO should primarily consider those pertinent factors which are not variable.

4.2 Asset Risk

In assessing the probability of an asset failure leading to a hazard impacting the safety of the premises and the occupants, the DNO should consider a range of relevant asset factors including but not limited to:

1. The age of the assets
2. Any electrical or physical inspection data on the condition of the assets
3. The design standard to which the assets were constructed – relevant standards.
4. The effectiveness of electrical protection arrangements.
5. The condition of fire sealing arrangements where known.
6. The combined risk of the service termination and the equipment attached to it.

Whilst a range of other environmental factors may be available e.g. sprinkler system etc. the data on these cannot be readily relied upon over time and should not normally be considered in the overall prioritisation.

5 Prioritisations of Interventions

The volume and accessibility of RLM installations is such that it is not practicable to assess and mitigate any identified risks within a short period of time such as a single regulatory period.

ESQCR requires all electrical assets to be managed in a manner so as to prevent danger in so far as reasonably practicable. Attaining compliance with this requirement is likely to require a programme of periodic asset inspections, risk identification, programme prioritisation and risk rectification in line with PAS55 / ISO 55000.

6 Intervention and Mitigation Management

Once assessed and prioritised it is essential that the assets the DNO is accountable for are managed and maintained. To do this an asset register should be set up.

1. Create a register of all buildings above a pre-determined number of storeys; the number of storeys is subject to individual company policy and risk assessment. The creation of the register will require liaison with numerous stakeholders.
2. Undertake an initial survey of each of the buildings to determine topology and ownership boundaries. Use the layouts in Appendix A to determine accountability for the building network assets. For those networks not considered to be the responsibility of the DNO contact with the BNO will be made and a responsibility schedule formalised and signed off.
3. For those identified as the responsibility of the DNO then a formal inspection will be undertaken.
4. The buildings that require replacement of internal mains will be prioritised and put into the programme with costs to determine the period for replacement. A typical example of chart prioritising replacement or maintenance works is shown in Appendix C.

5. All DNO assets are to be recorded in an asset management register and managed in accordance with PAS55 / ISO55001.

6. Appendix D details typical inspection and intervention options for DNO assets within MOBs.
Appendix A

Examples of typical installations, responsibility boundaries are denoted by the dotted line:

![Diagram showing DNO, Supplier, and Customer sections with LV Service, Shared Cut Out, and Rising Mains and Laterals Accountability Boundaries.]

Rising Mains and Laterals Accountability Boundaries

Fig 1: Single / Terrace Premises

<table>
<thead>
<tr>
<th>CO</th>
<th>Cut Out</th>
<th>M</th>
<th>Meter</th>
<th>CU</th>
<th>Consumer Unit</th>
</tr>
</thead>
</table>

Rising Mains and Laterals Accountability Boundaries

Fig 2: 4 Dwelling block

| CO | Cut Out | M | Meter | CU | Consumer Unit |
Rising Mains and Laterals Accountability Boundaries

Fig 3: Flats (Low rise)

<table>
<thead>
<tr>
<th>CO</th>
<th>Cut Out</th>
<th>M</th>
<th>Meter</th>
<th>CU</th>
<th>Consumer Unit</th>
</tr>
</thead>
</table>
Fig 4: Flats (Centralised meters)

| CO  | Cut Out | M  | Meter | CU  | Consumer Unit |

Rising Mains and Laterals Accountability Boundaries
Rising Mains and Laterals Accountability Boundaries

Fig 5: Flats (High rise)

<table>
<thead>
<tr>
<th>CO</th>
<th>Cut Out</th>
<th>M</th>
<th>Meter</th>
<th>CU</th>
<th>Consumer Unit</th>
</tr>
</thead>
</table>

DNO
Transformer LV Board

BNO
Multiway LV Board

Supplier
Multiway LV Board

Customer

Fig 6: Flats (High rise)

- CO: Cut Out
- M: Meter
- CU: Consumer Unit

Rising Mains and Laterals Accountability Boundaries
Typical Risk Assessment

<table>
<thead>
<tr>
<th>Person(s) / Dept. carrying out risk assessment:</th>
<th>Date:</th>
<th>Ref:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of task, activity or scenario being assessed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a risk that the condition of legacy RLM equipment may deteriorate to such an extent that an electrical short circuit or overheating occurs resulting in a fire within a residential building and potential fatalities.

The risk is stratified into 3 categories:
1. Those installations with internal RLM equipment installed to IET and other relevant standards
2. Those failing to meet modern relevant standards and within buildings of higher population density and height
3. Those failing to meet modern relevant standards and within buildings of a lower population density and height

Remember, when assessing the hazards, you should consider the hierarchy of control:
1. Elimination – Remove the hazard
2. Substitution / Reduce – Replace the hazard with a lower risk
3. Control – Install or use additional measures, safety devices or barriers
4. Administrative Controls – Use working procedures to minimise exposure to the hazard e.g. permits to work, signage.
5. PPE – Use PPE to protect

Individual Skill, Knowledge, Aptitude, Training and Experience underpin these controls.

### Risk Control Measures

<table>
<thead>
<tr>
<th>Risk</th>
<th>Person(s)</th>
<th>Control Measures</th>
</tr>
</thead>
</table>
| Death(s) due to fire | Multiple | Elimination  
- Renew wiring to latest relevant standards and implement a suitable and sufficient inspection regime to monitor condition and highlight future maintenance and replacement programmes  
- Agree / transfer accountability / ownership of the RLM with the Building Owner |
| Death(s) due to fire | Multiple | Substitution / Reduce  
- Inspect installations and implement partial replacement programme of equipment deemed to be at risk of imminent failure.  
- Inspection programme commenced and prioritised in line with population density and building height  
- Install remote monitoring equipment  
- Only fire barriers damaged by the DNO are to be repaired under instruction from the BNO appointed Fire Officer |
| Death(s) due to fire | Multiple | Control  
- Discuss stratification of building population risk into Higher, Medium and Lower criteria with regional fire services  
- Building height criteria limits to be set based on individual company policy and risk assessment |
| Death(s) due to fire | Multiple | Administrative Controls  
- Undertake an enhanced inspection and management programme  
- Prioritise replacement / repair works in line with maintenance programmes.  
- Record assets in Asset Plan and Maintenance Plans  
- Ensure presence of contract with Building Owner for monitoring and maintenance |
| Death(s) due to fire | Multiple | PPE - Not applicable |

By Whom/ By When Completed?

Date: Person(s) / Dept. carrying out risk assessment:
Appendix C

Following an initial assessment prioritisation of the mitigation works should be developed; an example of a risk prioritisation table is shown below. Companies should develop the conditions and scoring to align with their own policies and procedures.

<table>
<thead>
<tr>
<th>HI</th>
<th>Asset Condition / Type</th>
<th>0-20</th>
<th>20 – 40</th>
<th>40 – 100</th>
<th>100 – 200</th>
<th>&gt;200</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 20 years old (LSOH cable)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>20 -40 years (PVC)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>40 -70 years (PVC)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>40 – 70 years old (MICC) or HI 1 to 3 with fault history.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>&gt;70 years (VIR) HI 1 to 4 with significant fault history.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
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Appendix D

Before any inspection or other work is undertaken in a MOB it is recognised good practice to liaise with the Building Owner to review any relevant works they may have planned.

Inspection Frequency

It is recognised that a significant proportion of assets may not have been inspected. The following frequencies are recommended after the initial inspection;

- 6 floors and above,
  - 5 years
    - Note: The first inspection after a substantial replacement or refurbishment of assets can be extended to 10 years.
- 5 floors, 4 floors and 3 floors
  - 10 years
- 2 floors and below
  - 20 years.

- Following the initial inspection where defects are identified, then until the condition can be remedied the DNO shall determine the inspection frequency required to adequately manage the risk observed.
- Where no defects are identified then normally no additional work will be undertaken until the next scheduled inspection.

The scope of any inspection shall be defined by the DNO to ensure sufficient information is obtained to adequately manage the asset.

Immediate risk control measures

Immediate risk control measures are measure that can be taken in very short timescales; generally less than a month, to reduce the risk identified by inspection.

These include but not limited to:

- Disconnect all or relevant sections of the asset
- Install monitoring or load management equipment
- Emergency repairs of a temporary nature
- Install enhanced electrical protection

Refurbishment

It is recognised that in many instances it is not necessary to replace all of the assets within a MOB. In such circumstances the DNO should identify those assets in need of remedial action
and replace or refurbish as required. Following refurbishment the asset condition and hence residual risk should be sufficient to last until the next scheduled inspection.

Replacement

DNO will have per company replacement specifications to satisfy relevant legislation and standards, meet local historical requirements and that reflect the nature of the building, its residents and environment. The specifications should be equivalent to ENA Engineering Recommendation G87.