Moorhead Richardson

Filler Joist Wall Investigation

The Ambassadors Theatre, London

Report prepared for

ATG Entertainment Ltd

Project Code P00706

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Filler Joist Wall Investigation

at

The Ambassadors Theatre, West Street, London WC2H 9ND

for

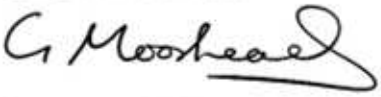
ATG Entertainment Ltd

Prepared by: Mark Richardson

Signature: 

Date: 07 August 2024

Reviewed by: Gareth Moorhead

Signature: 

Date: 07 August 2024

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APPENDICES

1 Introduction

On the instructions of ATG Entertainment Ltd. (the 'Client'), Moorhead Richardson Ltd. has carried out a filler joist wall investigation at The Ambassadors Theatre, West Street, London WC2H 9ND.

The site work was carried out on 29 July 2024.

The purpose of the investigation was to inspect the condition of the filler joist slanting wall structure due to evidence of corrosion of the joists, which has resulted in localised cracking and spalling of the render internally.

2 Extent of Investigation

The investigation area was undertaken internally to the first-floor slanting wall adjacent to the fly tower. A schematic drawing shows the wall elevation and is presented in **Figure A1** in **Appendix A**.

A visual survey and light hammer tapping survey was carried out and six representative joists were exposed for measurement and to ascertain their condition.

3 Investigation Methods

Scanning was undertaken to determine the position and depth of the steel joists using a combination of a GSSI Structure Scan Mini XT GPR scanner and an Elcometer SH covermeter.

The wall was scanned in both directions over the test area with the detected joists marked onto the rendered surface with crayon and the joist spacings recorded.

In six representative locations, a small pocket of concrete and render was broken out to allow inspection of the steel joist.

All equipment was operated in accordance with the manufacturers' instructions by competent and experienced personnel.

4 Results

The wall elevation and joist sizes are presented in sketches in **Appendix A** and selected photographs of the investigation are presented in **Appendix B**.

The findings of the condition of the joists are summarised in **Table 4.1** below.

Table 4.1 – Summary of the Joist Condition

Joist Ref.	Internal face joint flange	Web	External face flange
1	Light surface corrosion	Light surface corrosion	Heavy corrosion
2	Heavy corrosion	Heavy corrosion	Severe corrosion (flange completely corroded through)
3	Heavy corrosion	General surface corrosion	Heavy corrosion
4	General surface corrosion	General surface corrosion	Heavy corrosion
5	Light surface corrosion	General surface corrosion	Heavy corrosion
6	Heavy corrosion	Heavy corrosion	Severe corrosion (flange completely corroded through)

Description of corrosion grading:

- Light surface corrosion – Good condition, very slight rusting of the steel surface.
- General surface corrosion – Fair condition, rusting across the surface of the steel, but with no loss of section.
- Heavy corrosion – Poor condition, heavy surface rusting with the some loss of section likely.
- Severe corrosion – Heavy corrosion, with significant loss of section through corrosion.

The cover to the internal flanges of the steel joists is typically 15 to 25mm of clinker concrete and render.

5 Discussion

The type of filler joist construction observed within the wall at the inspection locations comprises steel joists supported on a steel beam section.

The concrete material observed within the wall appears to be clinker concrete. Clinker concrete is a relatively weak, porous material in comparison to normal modern concrete. It expands slightly on taking up moisture and this causes a loss of integrity.

Additionally, the sulphate in clinker concrete creates strong acidity if it becomes moist and can cause significant corrosion and loss of section to embedded steel elements.

The investigation found varying degrees of corrosion were present on the joists. The worst areas were the external flanges of the joists. It is understood that a gutter is present to the rear of the wall and that this has, on some occasions, become clogged and resulted in water running down the wall.

This is likely to be a contributing factor to the corrosion of the steel joists.

A structural engineer will need to check the structural performance of the wall, based on the corrosion discovered, and some remedial work will be necessary.

For future durability, it is essential that any guttering on the building is maintained to prevent water overflowing onto structural elements.

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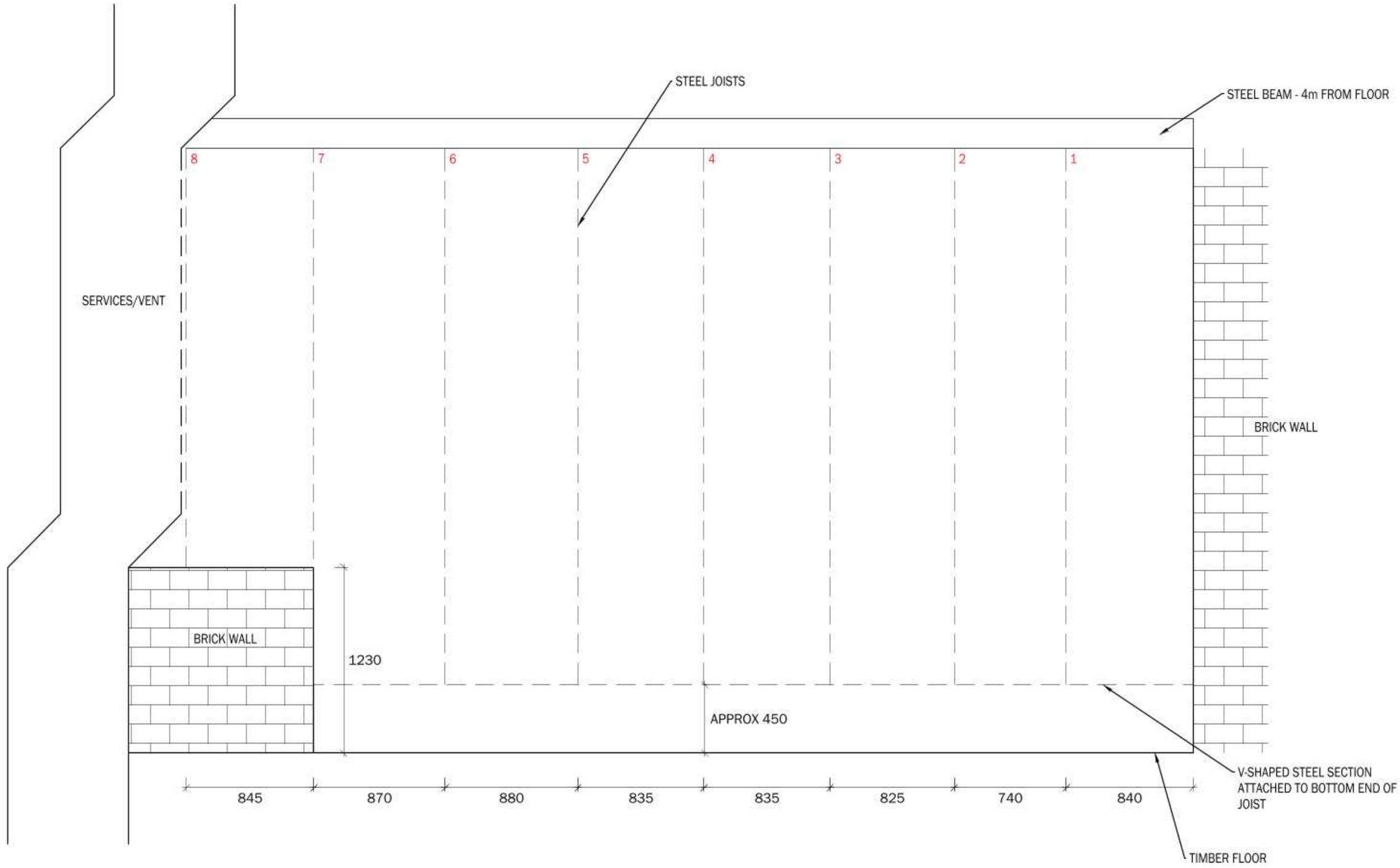
Appendix A

Investigation Results
(2 pages, not including this)



KEY:

1 = JOIST REFERENCE No.

Client/Engineer: ATG ENTERTAINMENT LTD	Drawing Title: ELEVATION OF FILLER JOIST WALL		
Project Title: AMBASSADOR'S THEATRE	Author: CB	Project Number: P00706	Figure Number: A1
	Date: JUL 2024	Scale Used: 1:25	Dimensions: mm

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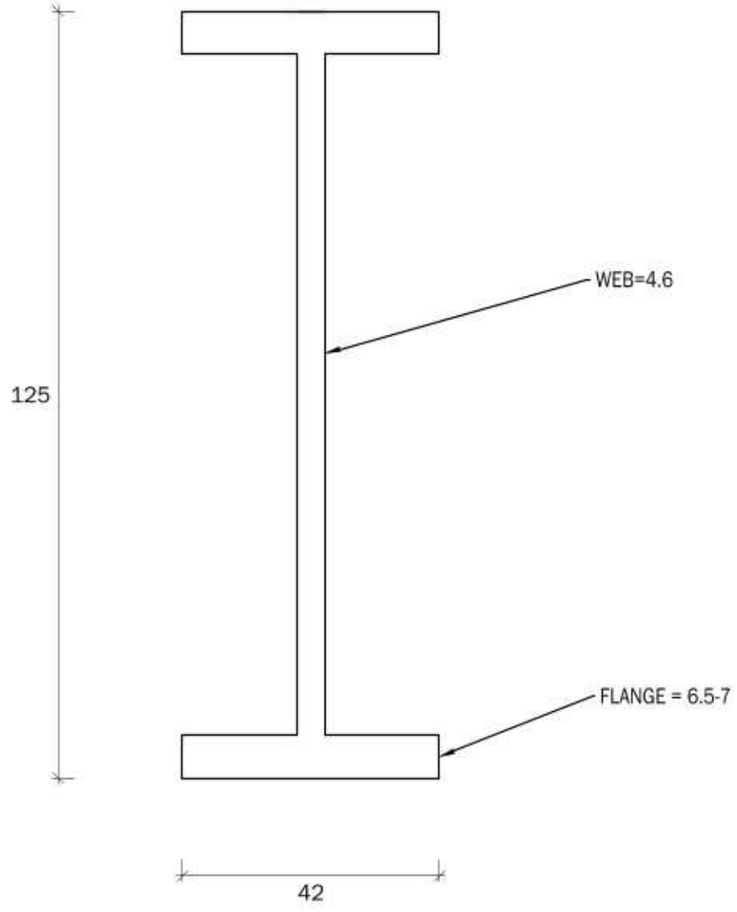
Scale 1:25

0 250 500 750 1000 1250mm

* FILER JOIST MEASUREMENTS IN mm
* ALL 6 No, JOISTS EXPOSED - MEASURED TO BE SAME DIMENSIONS



Client/Engineer: ATG ENTERTAINMENT LTD	Drawing Title: FILLER JOIST DIMENSIONS			Moorhead Richardson
Project Title: AMBASSADOR'S THEATRE	Author: CB	Project Number: P00706	Figure Number: A2	
	Date: JUL 2024	Scale Used: 1:1	Dimensions: mm	

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Appendix B

Selected Site Photographs
(9 pages, not including this)

Photo 1: Joist 1, general view before opening-up work. Crayon line indicates position of joist.

Photo 2: View of the web and front flange of joist 1.

Photo 3: View of the web and front flange of joist 2.

Photo 4: Close-up view of the web and front flange of joist 2.

Photo 5: Front flange of joist 3.

Photo 6: View of the rear flange, web and front flange of joist 3.

Photo 7: Front flange of joist 4.

Photo 8: Front flange of joist 5.

Photo 9: View of the front flange of joist 5 with the rear flange in the background.

Photo 10: Front flange of joist 6.

Photo 11: The rear flange at joist 6 exhibits severe corrosion with much of it missing.

Photo 12: Joist 7, not exposed.

Photo 13: Joist 8, not exposed.

Photo 14: General view of the wall.

Photo 15: General view of the wall.

Photo 16: The steel beam towards the top of the sloping section of the wall.

Photo 17: The horizontal steel section attached to joist 2. No brick wall encountered.