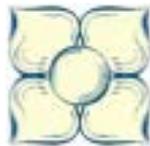


**Mill 5
Parkwood Mills
Stoney Lane
Huddersfield
HD3 4ZQ**

**Structural Inspection
of
End Gable Wall**

**August 2022
Y89**



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Introduction

This report has been prepared in response to instructions received from P J Livesey Holdings Limited. The brief was to undertake a visual non-intrusive structural inspection and report upon the following specific areas:

- a. Review the previous structural report of 2020 prepared by others.
- b. Review the nature of the supporting scaffold at the west gable.
- c. Visit the building with a view to accessing the building via what we may consider to be a safe stone staircase, noting that floors are likely to be of timber construction and prolonged water entry into the building is likely to have rendered these floors unsafe due to decay.

Access to undertake our visual inspection was provided to us by the current owner on 04th August 2022. Our inspection was visual, non-intrusive and undertaken on foot. The building is vacant, derelict and unsafe to access internally.

This report has been prepared for the sole use of P J Livesey Holdings Limited, their agents, appointed professionals and statutory authorities. It is not to be relied upon by any third party and shall not be distributed to other parties, other than statutory authorities, or insurers, without the consent of Blackett-Ord Conservation Ltd.

Historical Background

Listed Grade II property, entered onto the statutory list on 02nd December 2002. As a legacy listing there is no reference to specific reasons for listing. The list description is:

“Integrated Room and Power woollen mill. Mid-late C19. For the firm of John Broadbent and Sons, and tenants. Coursed local gritstone, stone and slate roofs. Plain style with little embellishment- some sill bands, dentilled eaves. A fire-proof interior to mill #2, at the north end next to the internal engine house; otherwise, cast-iron columns support massive timber cross beams, the column having flat faces for power transmission systems.

The main buildings of the group are numbered 1 to 8:

1. The earliest surviving mill built early 1850's on the site of John Broadbent's first mill. Parallel to and on west side of Stoney Lane. Five storeys, fifteen bays; wide pitched roof; rear stair tower centre. Re-roofed in the 1950's when the interior was rebuilt with concrete pillars and floors separate from the walls.
2. Probably built 1864, the first of the mills built during rapid expansion under the ownership of Butterworth Broadbent. Six storeys, sixteen bays. M roof; tall water tower with pyramidal roof centre of east side. Internal end engine house retains massive stone block walling and casting to support gearing of power transmission system. This engine house converted to rope race when the new engine house was added on the north end of west side early C20. Former boiler house at the north end, opening off the east side mill yard. The early C20 engine house of mill #2 at the north end has ornate moulded gable coping and round-arched windows. The interior

Figure 1 - Abstract from Historic England Listing, reference map. Mill numbers added for reference purposes.



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retains original white, blue and brown glazed brick wall linings and bricked east end opening for the rope race into the former end engine house. To north again former coal stores, economiser and surviving chimney of 1877. The chimney has a tall square stone plinth with corbelled cornice and brick chimney stack with moulded crown mounted on top. Reported to have been designed as a viewing platform and chimney on an Indian model by John Edward Broadbent who had served in the Indian army. It is a form known in Manchester cotton mills of the mid C19.

3. *Built about 1866. Six storeys. Extension of #2. Three parallel roofs and projecting privy/stair tower with taking-in doors on centre of south side.*
4. *Built about 1868 on the west side of #2. Three storeys. Modified mid C20 and few original features survive.*
5. *Built about 1870. Three storeys, twelve bays. Three parallel hipped roofs.*
6. *Completed by 1882. Four storeys. Built parallel to and on east side of Stoney Lane. Eighteen bays altogether, rear stair / privy tower. Glazed slate roof.*
7. *Built with #6 southern section.*
8. *The mill offices and entrance range, south of mill #1 and fronting the bend of Stoney Lane. The building to right of the arch is an office and dyehouse and may include early structure.*

The small mill reservoir at the north-east corner of the site is shown on the 1893 25" O.S. map extending on the north side of the road, close to the Methodist Chapel. By 1872 there were 12 named concerns in the Mill Rent Book and by 1881 there were 14 tenants. By 1887 the tenants included spinners, manufacturers, one dry finisher. In November of that year the Broadbents acquired the finisher's company and it became the Longwood Finishing Company Ltd, shares remaining in the hands of the Broadbent family until 1910. Lockwood Mills closed in 2001. The mill is a complete and unique example of the development of a large Room and Power business which returned to single company ownership in World War I. The mill stands in the centre of Dodlee Longwood Edge conservation area, 1981. Associated buildings include the Methodist chapel and the stone built valley-bottom village, mill owner's house and cottages on the hill side."

It would appear from the listing entry that Mill 5 is listed for its group value and not because of any specific unusual manufacturing use or construction significance.

The water from Clough Mill, Mill Pond appears to be culverted under the site of Parkwood Mill and discharges into a Mill Pond at the north west end of Parkwood. It



Figure 2 - Internal view of culvert - 28dayslater internet source.



Figure 3 - Abstract of 1893 Ordnance Survey Map.

is not clear from the historic mapping what route this culvert takes or how the water may have drawn by the mills to operate their manufacturing activities. The culvert entrance and exit alignment would seem to suggest it runs to the north east of Mill 5.

The north west facing gable end of the building is currently restrained by a freestanding tubular scaffold with water counterweights. This is bridged over the carpark access road between the two existing buildings (Mill 3 & Mill 5). There is no access to the scaffold and this is a designed scaffold.

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In December 2020 the gable elevation was inspected by STL Consulting Structural Engineers, who concluded:

- The wall was unstable.
- Water ingress into the building had increased due to loss of roof fabric, since their report in 2017.
- Intervention was needed to temporarily restrain the gable wall or to remove it.

We understand that the current scaffolding was installed January 2021.

Structural Observations

Structural Form

The building has a three bay hip ended roof structure consisting of timber trusses, purlins and boarding. Each slope has a line of roof lights and the trusses are supported on two rows of cast iron columns and the external masonry walls.



Figure 4 - Historical image, date unknown. Condition of roof and upper floor now considerably more deteriorated and partially collapsed.

The floors consist of timber joists supported on primary timber beams and two rows of cast iron columns.

The external walls consist of rough faced, coursed, local stone, with a vertical cavity filled with rubble and an internal skin of coursed stone.

Overall, the building is three storey high, with the ground floor cut into the slope of the ground, so at the south east end it is a partial basement. The ground / basement is divided by a longitudinal coursed stone wall, set in from the south west facing elevation, again to accommodate the natural slope of the ground.

Structural Condition

The building is in a very poor condition with areas of partial roof and floor collapse. The primary cause for these areas of collapse is timber decay fueled by prolonged water entry into the building through the roof and wall openings.

Unlike other mill buildings there is no stone stair core, instead timber stairs between the floors located at various points in the floor plate. Like many other mill buildings the floors are fully open plan. Therefore, the overall stability of the building relies on the diaphragm action of the floor plates to distribute horizontal loads to the external walls. This stability has been compromised by the decay and areas of partial collapse of the floors. Structurally the building can be considered to less than robust and as such further internal loss of timber structure could lead to failures in the external walls due to loss of restraint.

At the north west gable, such movement and deformation of the gable elevation has already occurred. This is evident from vertical out of plumb of the wall and the twist in the masonry piers between the windows. Further evidence of lateral movement of the gable is visible at the north west return corner, where there is a series of cracks through the spandrel walls below the window cills. These have tell-tales in place which can no longer be read due to weathering. The cracks visually look to be over five years old, follow mortar joints and some stones as well as being evident in the original lime/ash mortar as well as the black mortar path pointing.

The masonry walls are also vulnerable to increases in moisture content from prolonged exposure to leaks from above. The 'cavity' construction is not a contemporary cavity with ties. As such the fill material in the cavity between the two masonry leaves can hold moisture longer and also lead to the washing out of the fine material, causing larger voids to create between the stone leaves and also bulging of the outer stone leaf where the fill is consolidated by the water. In some cases these areas can react to the freeze thaw cycle during the winter months leading to additional forces pushing the two leaves further apart.

The roof lights may have been reglazed historically, but failure of the glazing, as well as slipped stone tiles and blocked / deteriorating valley gutters are all contributing to significant water ingress. This is leading to areas of collapse roof structure and floor structure throughout the height of the building due to rot. Pigeon guano is also an environmental hazard on the upper floors.

The partial collapse of the floor and roof structures are leading to an increasing loss of restraint to the perimeter walls. Progressive collapse of the floors is a possibility as the capacity of each floor is reduced by decay and collapsing floors from above have an increased weight caused by the absorption of water.

The addition of the freestanding counterweighted restraint scaffold at the north west gable elevation in our opinion was a correct temporary response to active movement. It is not however a long term solution. It also only addresses one of the active failure mechanisms that could lead to further collapse of the building.

Whilst we have not investigated the foundations, the sub-strata or the potential impact of the below ground culverted watercourse and drainage; none of the defects we have observed from our visual inspection would lead us to conclude that there was a below ground failure associated with the deterioration of the building.

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The primary structural defect with this building is its original construction, lack of structural redundancy (robustness) and the continuing deterioration due to water entry. Its current state also makes it very difficult to develop a safe system of working, especially if personnel need to access the internal areas of what is effectively an unsafe building.

Revisit Assessment of Condition

We received instructions from P.J.Livesey Holdings Limited to revisit Mill 5 and undertake a further inspection to answer the following specific questions:

1. Note any worsening of the structure, in particular existing timber deterioration.
2. Reliance of the scaffold in supporting the structure.
3. Details on if the building can be repaired safely.
4. Details on how long the building can survive with its progressive deterioration.
5. How would the building react if it was to fail, would this pose a threat to individuals or existing buildings.

We were also provided with scaffold calculations and a scaffold drawing from 1st Advanced Access Ltd relating to the scaffold system in place at the north-west facing gable of the Mill.

We visited the building on 09th May 2023 and undertook a visual inspection from ground level. We observed the following:

1. There are further areas of the second floor and first floor that have collapsed due to decaying timber elements caused by prolonged water entry through the roof.

From reviewing the scaffold information provided from 2020/21:

2. The scaffold is not designed as a façade retention scaffold. It has been designed as a free-standing scaffold to resist the horizontal wind forces imposed upon it from the gable wall structure. It therefore relies on the water kentledge (18no in the calculations) of which there are 18No in place, but some have been maliciously drained of their water content. We also observed that the ScafTag recorded the last inspection as being March 2021, which we assume only relates to it being a Class 3 access scaffold. Some of the timber boards have been replaced with metal / composite. Although the timber boards used as ground spreaders for the standards may now be beyond their usable date. No crushing of these timber spreaders was noted.
We noted that some of the window lintols in the stonework were backed with a steel lintol, rather than a timber lintol which we believe is more extensively used above the other openings of the building.
The scaffold is performing a function, in so far as it will prevent the majority of the masonry gable from falling out from the building if it were to collapse.

To answer to specific questions further:

3. We remain of the view that to repair or dismantle this building in its current condition is a challenge. Health and safety is a paramount consideration and

it requires a very careful consideration sequencing and safe access to develop a safe method of working. Minor elements such as being able to release primary members from the surrounding masonry at bearing ends will need to be undertaken to prevent their removal imposing forces into the masonry that could result in localised areas of collapse. We do not see a large machine sitting remote from the building, pushing or pulling walls or structural elements as a controllable safe method of working.

The approach in our opinion is one of dismantling, rather than demolition and will therefore require a specific type of contractor to deconstruct the building safely.

4. Since our initial visit to the building on 21st August 2022 the building has deteriorated further internally. The tell-tale fixed external is not currently indicating any active movement in the masonry walls.

This deterioration of the timber structural elements will accelerate and will be exponential over time. At some indeterminable point a collapse of a structural truss or a primary beam will drag with it the external masonry, or will push the wall out depending on whereabouts the timber element fails.

5. Mill buildings with their clear floor plates acting as diaphragms and proportions of windows to walls between floors in their elevations, mean that the mode of failure can occur as a hinge at either or both cill or window head level. Rotation of the wall about these hinges can occur either inwardly or outward.

With regards to the integrity of the floors, the main source of water entry is via the holes in the roof. This means that in general deterioration occurs in vertical alignment. However, as an area of floor collapsing onto the floor below adds dynamic and dead weight to the subsequent floor and as such a more progressive collapse that is more widespread can occur.

These modes of failure are not predictable, but we do perceive a risk to the general public and is why we still recommend as our original report did in our Recommendations section below that Total Dismantling was the only way forward for this building.

Recommendations

The following options are considered as possible scenarios, based upon the current observed structural condition of the building:

Do Nothing

Not a likely viable option.

The gable restraint scaffold is a temporary solution, with a limited design life and short term effectiveness.

The building will continue to deteriorate and uncontrolled further collapses will occur.

Partial Dismantling

Theoretically a phased dismantling of the entire building could be developed. (The issues are not just the temporarily restrained gable).

This would result in horizontal and vertical stepping of the retained structure.

This would need to be in stages working remotely from one end and above the building.

Would involve the addition of internal temporary bracing and restraint systems.

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The restraint scaffold precludes the ability to undertake this activity from the preferred starting point. (Negates the logical start point of this solution and increases the risk).

Complete Restoration

A safe system of work would be very complicated and involve points at which high risk could not be mitigated against.

Logically work should progress from the ground up. This would require the installation of crash decks and overhead working protection (Safe zones). These could not be achieved without points of high risk.

The external walls could not be left unrestrained.

Structural remedial work and the installation of new flooring would need to be done on a floor-by-floor basis, progressively working up to roof level.

Total Dismantling

The building sits within a constrained site footprint.

A top-down operation, possibly from man baskets and utilizing skips, both from cranes.

Progressive operations floor by floor.

Cranes to lift off large elements once individual connections have been released. (i.e. remove stone from around timber bearings / release cast iron column and timber beam fixings).

Salvaged material could be inspected and suitable reusable material set aside.

Next Steps

We would suggest the following next steps:

- Consider the recommendations made in this report.
- Discuss with the Local Authority Heritage Officer and the Planning Officer the current status of the Planning Consent for the entire site under your ownership.
- Discuss with them the condition of Mill 5 presented by this report and the outline of options available.
- A wider heritage impact and financial viability statements may be required to enable the next steps to be agreed by all parties.



Blackett-Ord Conservation Engineering

Ian Weir CEng, MSc, MICE, Care Registered Engineer

18th August 2022

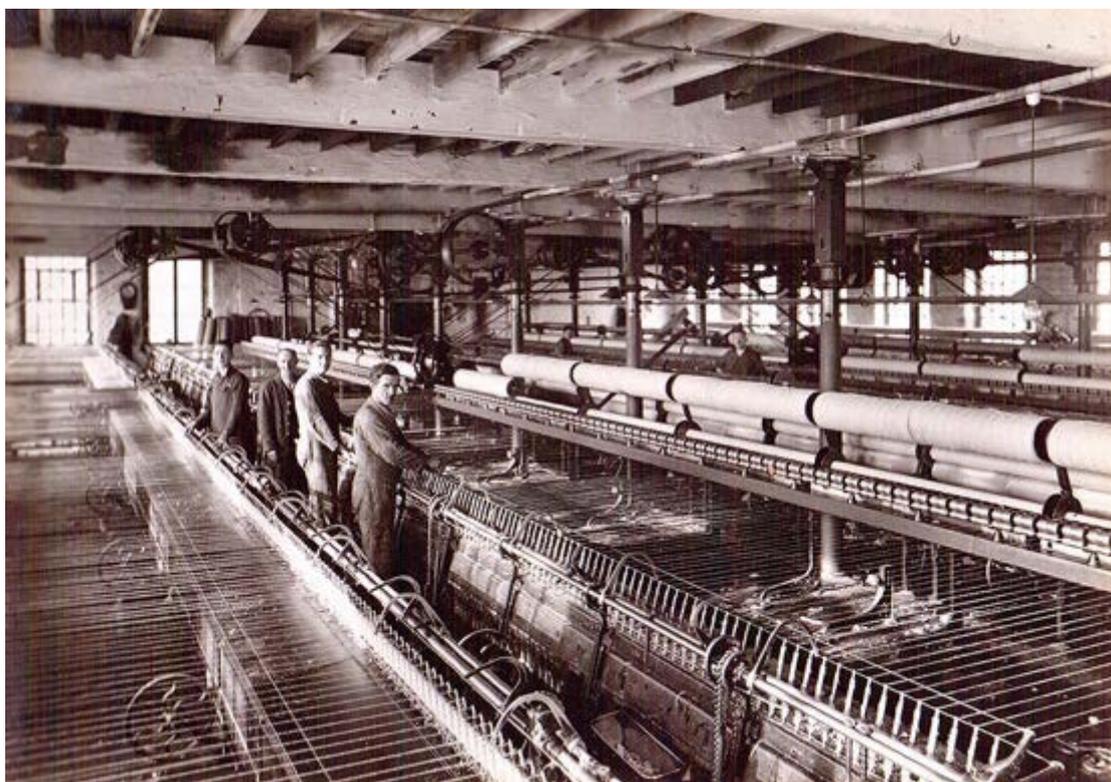
Version 1 – draft issue – 18th August 2022.

Version 2 – final issue – 23rd August 2022.

Version 3 – revisit and up dated condition assessment – 12th May 2023.

Appendix 1

Historical images.



Appendix 2

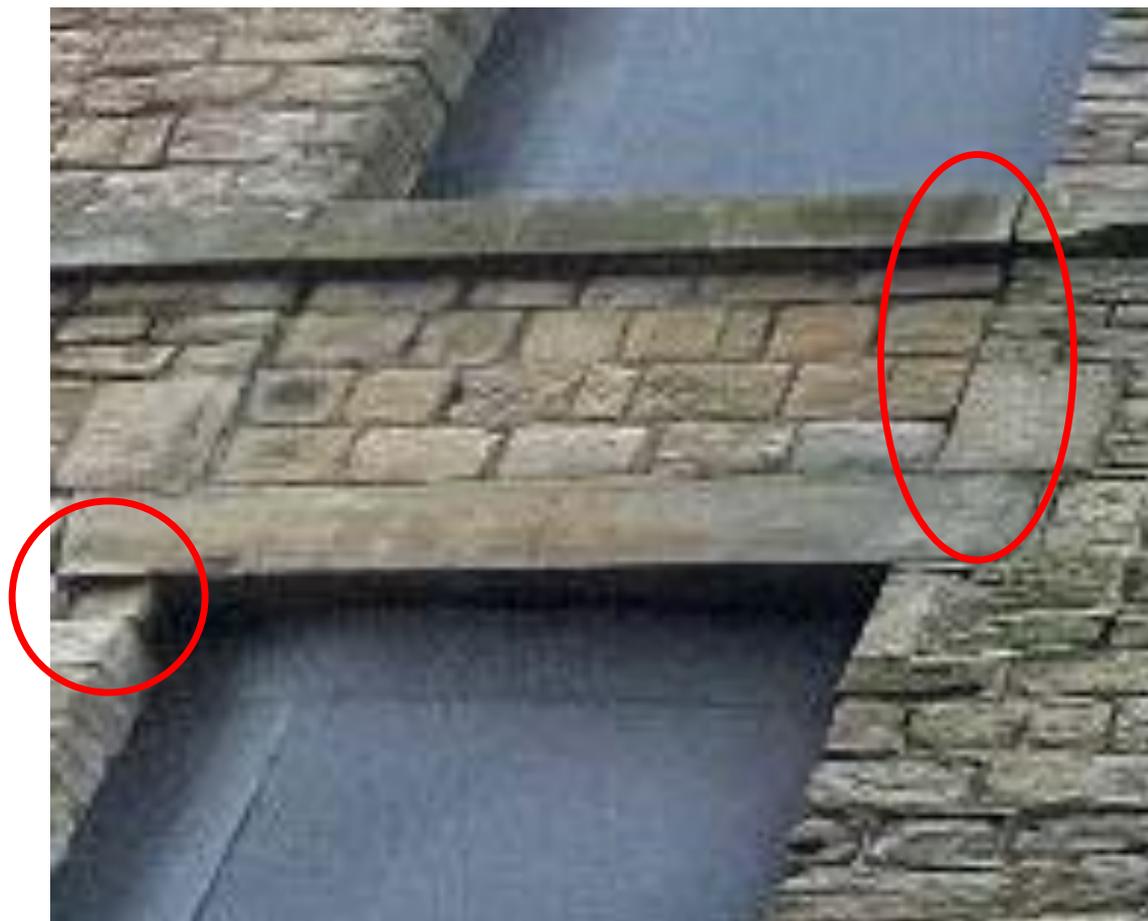
Atypical photographs taken during our inspection of 04th August 2022.













Appendix 3

Atypical photographs taken during our inspection of 09th May 2023.







