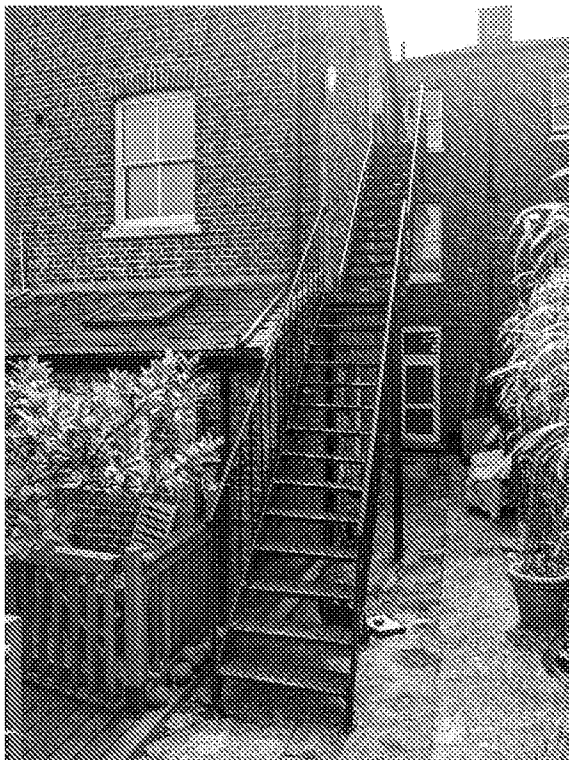


Paul Grinyer Associates Ltd

Structural Engineers  
& Party Wall Surveyors

## Structural Engineering Report

**36 South Terrace, Littlehampton, BN17 5NU:** Report on condition of external fire escape staircase and landings.



### Client

**Ms K De Vries**

Flat 3, 36 South Terrace, Littlehampton, BN17 5NU

**Ref:** 21113

**Date:** 31<sup>st</sup> August 2021

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Paul Grinyer Associates Ltd, 17 Highlands Road, Portslade, BRIGHTON, East Sussex, BN41 2BN

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## **Instruction**

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Paul Grinyer Associates Ltd were instructed by Ms K De Vries, the client, to carry out a structural inspection and report on the condition of the external, steel, fire escape staircase and landings to the property, rear of the property.

## **Limitations**

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This report is intended for the client's own private and confidential use and for their legal and professional advisors. It should not be reproduced in whole or in part or relied upon by third parties for any use whatsoever, without our express written authority.

We have not inspected other parts of the building or other structures, nor have we inspected areas which are covered, unexposed or inaccessible, and we are, therefore, unable to report that any such part of the property is free from defect.

Our inspection of the external fire escape staircase was carried out from ground level and from the staircase and landings themselves, inspecting only those areas which were safely accessible from the same.

## **Inspection**

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An inspection of the external fire escape staircase was undertaken on 31<sup>st</sup> August 2021. Access to the fire escape was made via Flat 3 (second floor flat to which it served as an escape stair).

## General description

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The structure was a three storey, external, galvanised mild steel and cast iron, staircase constructed with mild steel concave flat bar handrails, solid bar balustrade infill, square hollow section balustrade posts at the bottom of the first stair flight, flat plate stringers, profiled “durbar” type landing plates and cast iron stair treads bolted to the stringer.

It appeared the staircase was relatively old and had probably been in place for more than 50 years.

One steel column and a pair of gallows brackets provided support to the main staircase and landings with the gallows brackets cantilevering from the external solid brick wall of the property.

The property is known to be Grade II Listed and forms part of a terrace of three storey town houses, originally built in the 1860’s and now split in to three flats, one per floor.

## Observations

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|                             |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                     |              |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>General description</b>  | A three storey, external, galvanised mild steel, staircase constructed with mild steel flat bar handrails, solid bar balustrade infill, square hollow section balustrade posts, flat plate stringers, profiled “durbar” type stair treads and landing plates. |                                                                                                                                                                                                                                                                     |              |
| <b>Level</b>                | <b>Element</b>                                                                                                                                                                                                                                                | <b>Condition</b>                                                                                                                                                                                                                                                    | <b>Photo</b> |
| Ground floor to first floor | Supports                                                                                                                                                                                                                                                      | Evidence of corrosion to the single support column below the first floor landing. Foundation arrangement unknown. Stair stringers welded to 25mm x 25mm square final balustrade post bearing on to possible brick spreader below cracked and damaged concrete slab. | 1 & 2        |
|                             | Ground to first floor stair flight                                                                                                                                                                                                                            | Evidence of significant structural damage and deterioration of the stair flight, which was deformed and twisted over its span. 11 of the 14 cast iron stair treads were cracked through their                                                                       | 3 to 8       |

|                       |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |
|-----------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                       |                                     | entire depth, with some un-supported, some supported by rudimentary brackets and some un-supported where such brackets had failed. Structural defects & corrosion noted to the stringers, balustrade infill and bolted connections. Balustrade infill was spaced at 200mm centres.                                                                                                                                                                                                                                                                      |          |
|                       | Main support column.                | The support column appeared to be a more modern addition to the staircase structure, possibly replacing an older, defective column, or potentially replacing cantilevering gallows brackets from the original structure. The column showed signs of corrosion damage but mainly in the form of smaller areas of lifting paint. The column was not plumb and leaned out at first floor landing level.                                                                                                                                                    | 9        |
|                       | First floor landing                 | Evidence of significant structural defects noted to the landing structure. Surface corrosion, delamination and distortion to the landing floor plate noted. Significant corrosion to the angle section elements forming the framing to the landing, beneath the floor plate. Corrosion to the bolted connections. Corrosion and delamination to the angle sections embedded in the solid brick external wall of the main building, causing cracking and damage to the brickwork. Corrosion noted to the balustrade infill and their bolted connections. | 10 to 14 |
| First to second floor | Cantilevered gallows bracket        | Significant corrosion noted to the angle sections forming the triangular gallows brackets and their connections, together with corrosion where embedded in to the external wall of the main building.                                                                                                                                                                                                                                                                                                                                                   | 15 to 20 |
|                       | First to second floor stair flight. | Evidence of significant structural damage and deterioration of the stair flight, which was deformed and twisted                                                                                                                                                                                                                                                                                                                                                                                                                                         | 21 & 22  |

|              |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |
|--------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|              |                              | <p>over its span. Some of the cast iron stair treads were showing signs of potential development of cracks and defects similar to those previously formed to the lower stair flight, though none appeared to have cracked through their entire depth and had not been repaired. Structural defects &amp; corrosion noted to the stringers, balustrade infill and bolted connections, though the extent of damage was less than to the lower flight. Corrosion and damage was noted to the connections to the first floor landing. Balustrade infill was spaced at 200mm centres.</p>                                                                                                                                                                                                                                       |          |
| Second floor | Cantilevered gallows bracket | <p>Significant corrosion noted to the angle sections forming the triangular gallows brackets and their connections, together with corrosion where embedded in to the external wall of the main building.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 23       |
|              | Landing                      | <p>Evidence of significant structural defects noted to the landing structure. Surface corrosion and distortion to the landing floor plate noted, which appeared a more modern element than the rest of the structure, possibly installed to replace a defective landing floor in the past. Significant corrosion to the angle section elements forming the framing to the landing, beneath the floor plate. Corrosion to the bolted connections. Corrosion and delamination to the angle sections embedded in the solid brick external wall of the main building, causing cracking and damage to the brickwork. Corrosion noted to the balustrade infill and their bolted connections. The gallows bracket to the end of the landing appeared to be pulling out of the wall and hand caused cracking in that location.</p> | 24 to 30 |

## Discussion

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The external, steel, fire escape staircase was found to be in very poor and unsound structural condition, with evidence noted of significant structural defects and inadequacies which compromise the safe use of the structure.

It is understood that whilst the staircase's primary function is that of a fire escape serving Flat 3 on the second floor of the building, it is used as a general access to that flat from the garden, garages, and parking area. It is therefore used on a regular basis rather than just for emergency use.

The protective coatings to the entire staircase had failed and evidence of significant corrosion was present to most of the structural elements.

The lower stair flight had numerous cracked and damaged cast iron tread plates forming the structure and which were in a failed condition, with repairs also either inadequate or having failed also. The lower flight is in an unsafe condition.

The staircase had distorted and appeared to be rotating away from the building.

It was not clear when the staircase was erected, but it was thought likely that it was probably in excess of 50 years old and did not appear to have undergone any form of planned, preventative maintenance work.

## Recommendations

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The staircase was old and found to be in very poor and unsafe condition, with evidence of significant corrosion to most elements forming the staircase and with some of the cast iron treads noted to have failed and cracked. Unfortunately, given the condition of the structure and its general form and arrangement it is considered to be in a condition beyond repair and must therefore be replaced with a new structure.

The replacement staircase will need to be designed to comply with current Building Regulations requirements, including for provision of external lighting etc.

The current condition of the staircase and landings is such that we must unfortunately recommend it is not used for any purpose other than an emergency in case of a fire. It is our considered opinion that there is a significant risk to the safety of anyone using the staircase, which could potentially suffer from further localised failure or even more significant failure if it were to become detached from the supporting wall.

The staircase and landing must not be used under any circumstances for any maintenance work or similar such purposes. Should such work be required where access at high level is needed an independent access scaffold should be used.

External steel structures of this type and in particular where they are located in coastal regions, will require ongoing, planned maintenance in order to prolong their working life. This structure appears to have had little planned maintenance work carried out to it and as such is now in a deteriorated, potentially dangerous condition and must be replaced.

Replacing the staircase will require planning permission, including Listed Building Consent most likely and you will need to employ a building consultant to deal with such aspects of gaining permission for a replacement structure prior to engaging further with designing and detailing a new staircase to obtain Building Regulations Approval and contractors costs.

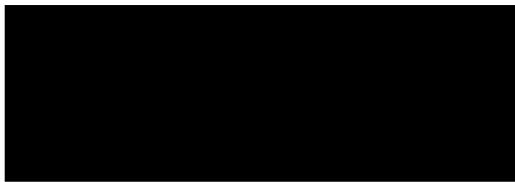
## Conclusions

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Paul Grinyer Associates Ltd were instructed to inspect the external steel fire escape staircase at the above property in order to review its structural condition and confirm whether defects were present and if such defects could be repaired.

Significant structural defects have been identified, which lead us to recommend the staircase is replaced and we strongly recommend it should not be used for general access purposes in its present condition. A suitable replacement staircase should be installed. Using the staircase poses a significant risk to the safety and welfare of the users and anyone in the vicinity, should further or sudden failure occur.

External steel structures of this type and in particular where they are located in coastal regions, will require ongoing, planned maintenance in order to prolong their working life. Any replacement structure should have a suitably specified protective coating system and must be maintained by regular repainting on at least a four yearly cycle.



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Prepared by: **Eur Ing. PAUL GRINYER CEng MStructE CBuildE FCABE**

For and on behalf of Paul Grinyer Associates Ltd

## Appendices - Photographs

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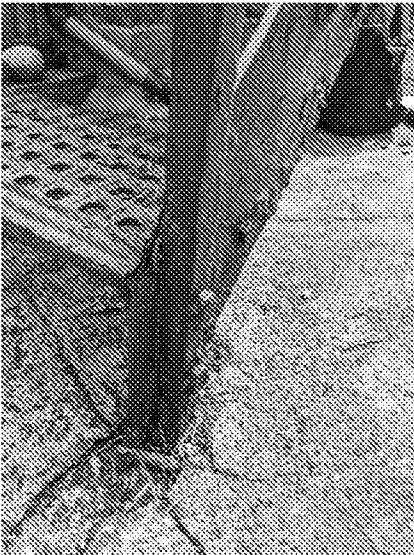
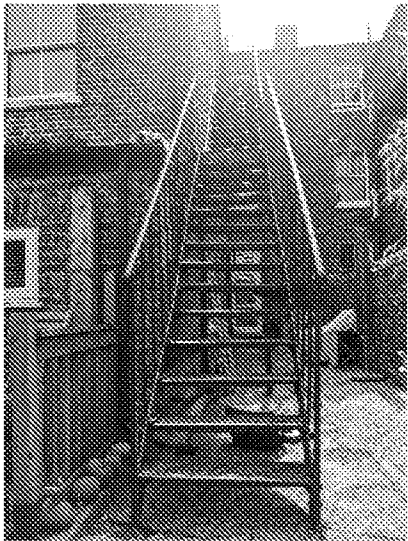
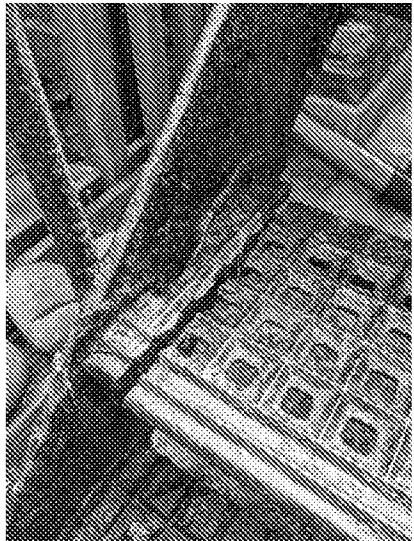
| Photo 1                                                                                                                                                                                                                                                                                                                                        | Photo 2                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  A black and white photograph showing a close-up of a person's lower leg and foot. The person is standing on a rough, textured surface, possibly a concrete step or a similar structure. The leg is dark, and the foot is visible at the bottom of the frame. |  A black and white photograph showing a close-up of a person's lower leg and foot. The person is standing on a rough, textured surface, possibly a concrete step or a similar structure. The leg is dark, and the foot is visible at the bottom of the frame. |
| Photo 3                                                                                                                                                                                                                                                                                                                                        | Photo 4                                                                                                                                                                                                                                                                                                                                         |
|  A black and white photograph showing a person standing on a set of stairs. The person is wearing a dark jacket and light-colored pants. The stairs are made of concrete and have a metal railing. The background shows a building with a window.           |  A black and white photograph showing a person standing on a set of stairs. The person is wearing a dark jacket and light-colored pants. The stairs are made of concrete and have a metal railing. The background shows a building with a window.           |

Photo 5

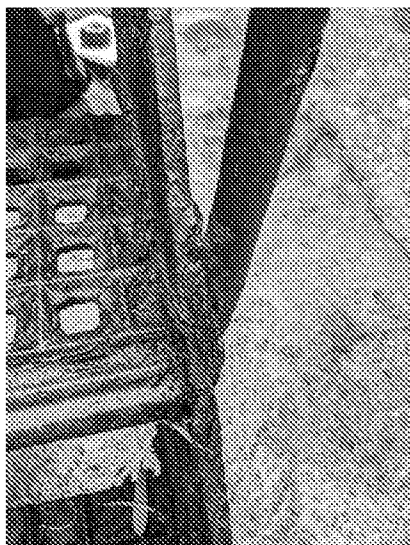


Photo 6

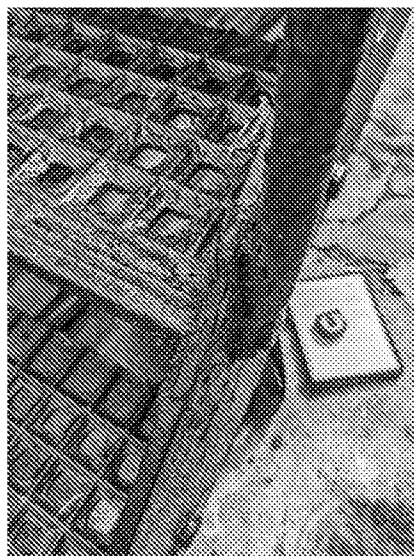


Photo 7

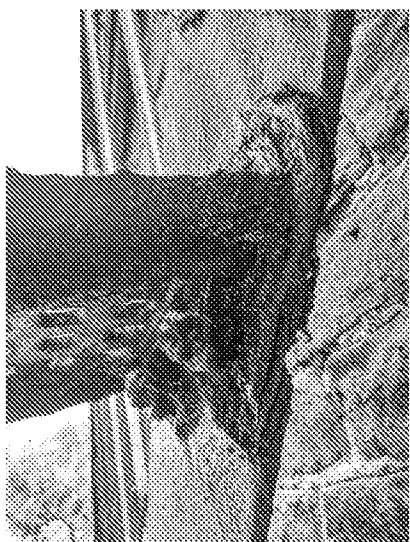


Photo 8

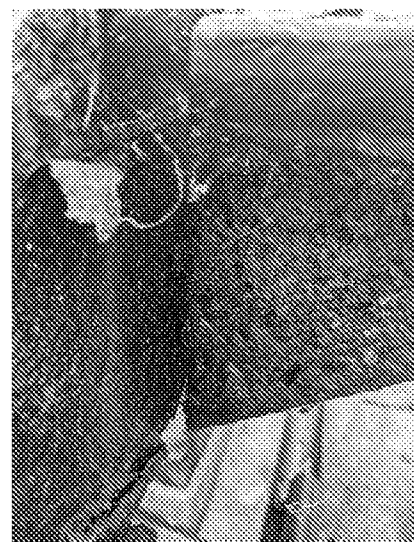


Photo 9

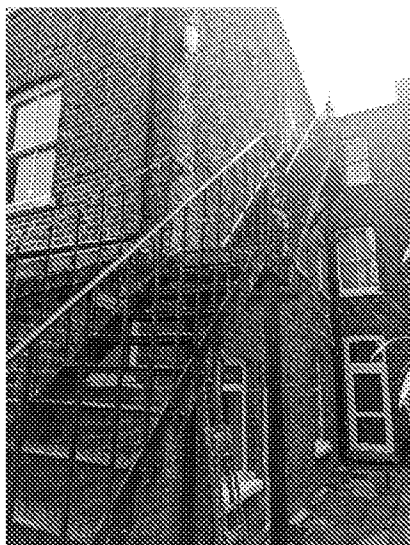


Photo 10



Photo 11



Photo 12

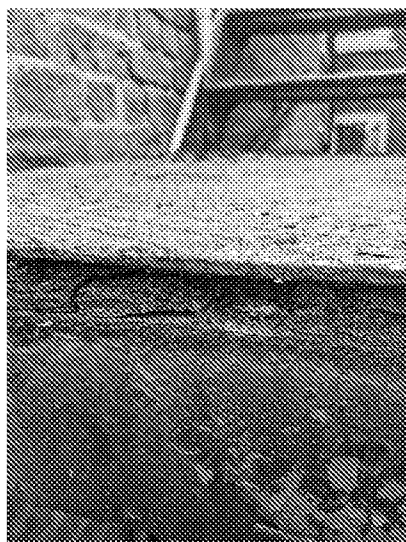


Photo 13



Photo 14



Photo 15

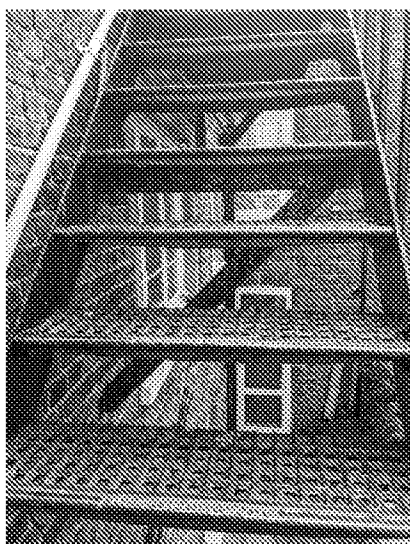


Photo 16



Photo 17



Photo 18

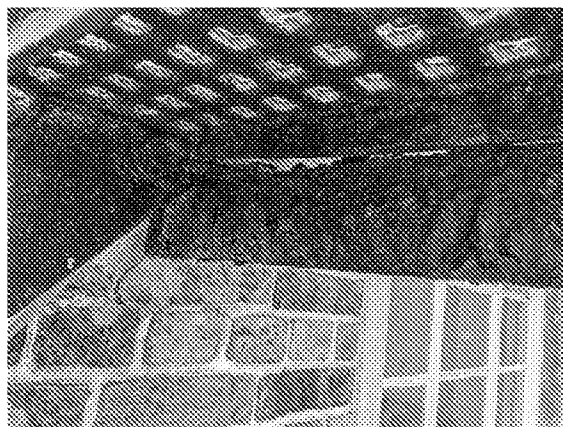


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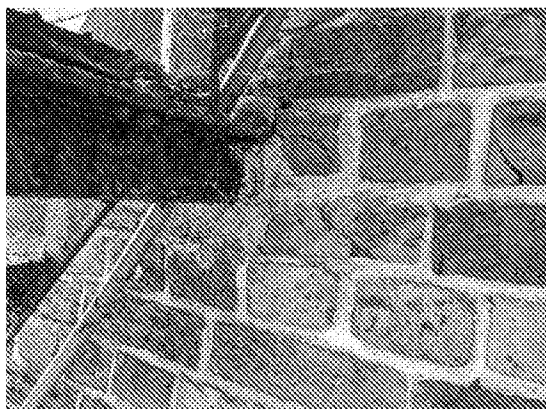


Photo 20



Photo 21



Photo 22



Photo 23

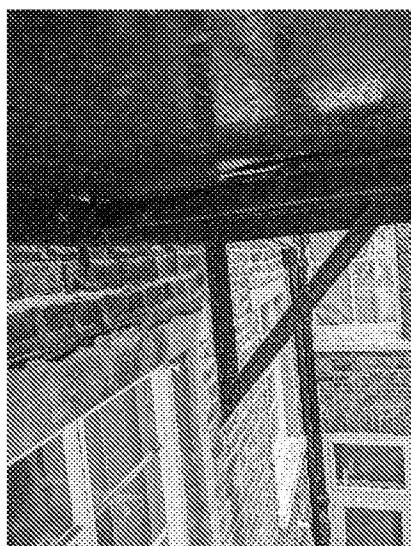


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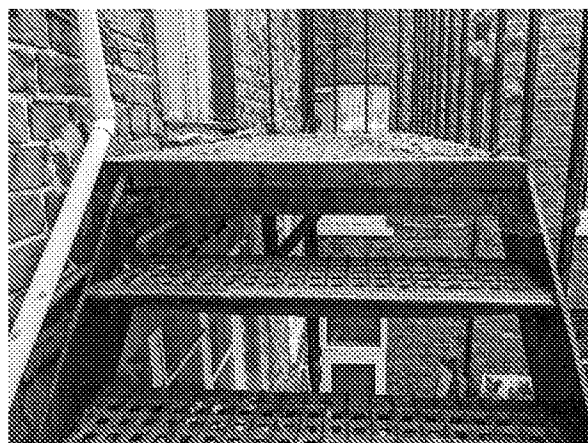


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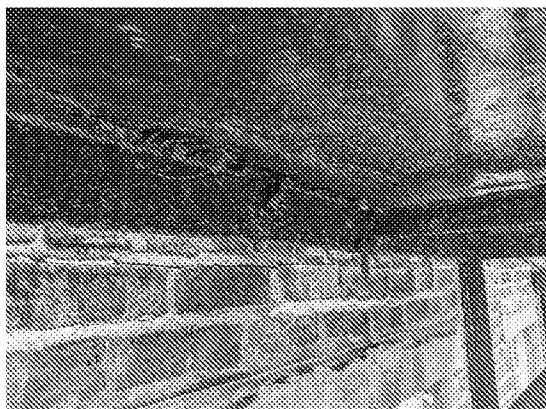


Photo 26



Photo 27

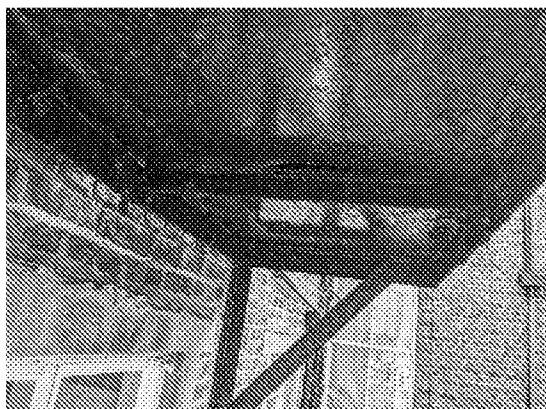


Photo 28



Photo 29



Photo 30

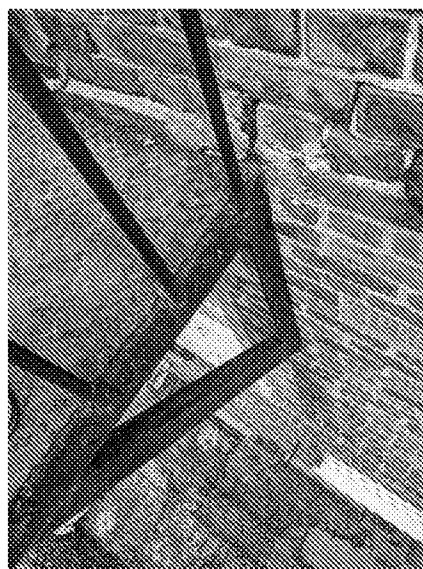


Photo 31

