

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE OFFICES' COMMITTEE
JOINT FIRE RESEARCH ORGANIZATION

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A MULTI-STOREY BUILDING FOR EXPERIMENTS ON THE SPREAD OF FIRE AND SMOKE

by

L. A. Ashton

SUMMARY

This note describes a multi-storey building now being erected at the Fire Research Station, outlines its origin and the many purposes it can serve and gives details of the first programme of work.

December, 1956.

Fire Research Station,
Boreham Wood,
Herts.

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1. Introduction

In June 1954, on the initiative of the Ministry of Housing and Local Government, a meeting was arranged between representatives of the Ministry, the London County Council, the Building Research Station, the Home Office and the Fire Research Organization to discuss the question of fire resistance for the external walls of dwellings of more than two storeys. It was stated that the present Byelaw requirements relating to such walls were in some respects unduly restrictive, since developments in building practice, which might effect considerable savings in costs, could not be shown to satisfy accepted standards. The meeting was asked to consider the technical aspects concerning the validity of the Byelaw requirements, confining its attention in the first place to non-loadbearing walls.

Protection against the spread of fire vertically on the external face of multi-storey domestic buildings is provided for by requiring either (a) a separating wall of fire resisting construction (1/2 hour or 1 hour) between the head of a window in one storey and the cill of the window in the storey immediately above; or (b) a horizontal projection or balcony of non-combustible materials. In the Model Byelaws of the Ministry of Housing and Local Government the minimum vertical separation under (a) must be 3 ft., of which at least 2 ft. must be from cill to floor level, and the minimum horizontal projection under (b) is 2 ft. 0 in.

The vertical "baffle" wall has been a feature of buildings for many years and it is regarded as a fundamental requirement for fire protection, although there appears to be no direct evidence of its value in actual fires. Many views were expressed at the meeting on the properties required for such walls and the materials permissible, but it was apparent that only experimental work could give discussions a factual basis. The Fire Research Organization undertook to make an investigation, using models, of the effect of area of window and amount of horizontal or vertical separation on fire spread on the outside of a building, and the exposure hazard associated with buildings having various percentages of window openings.

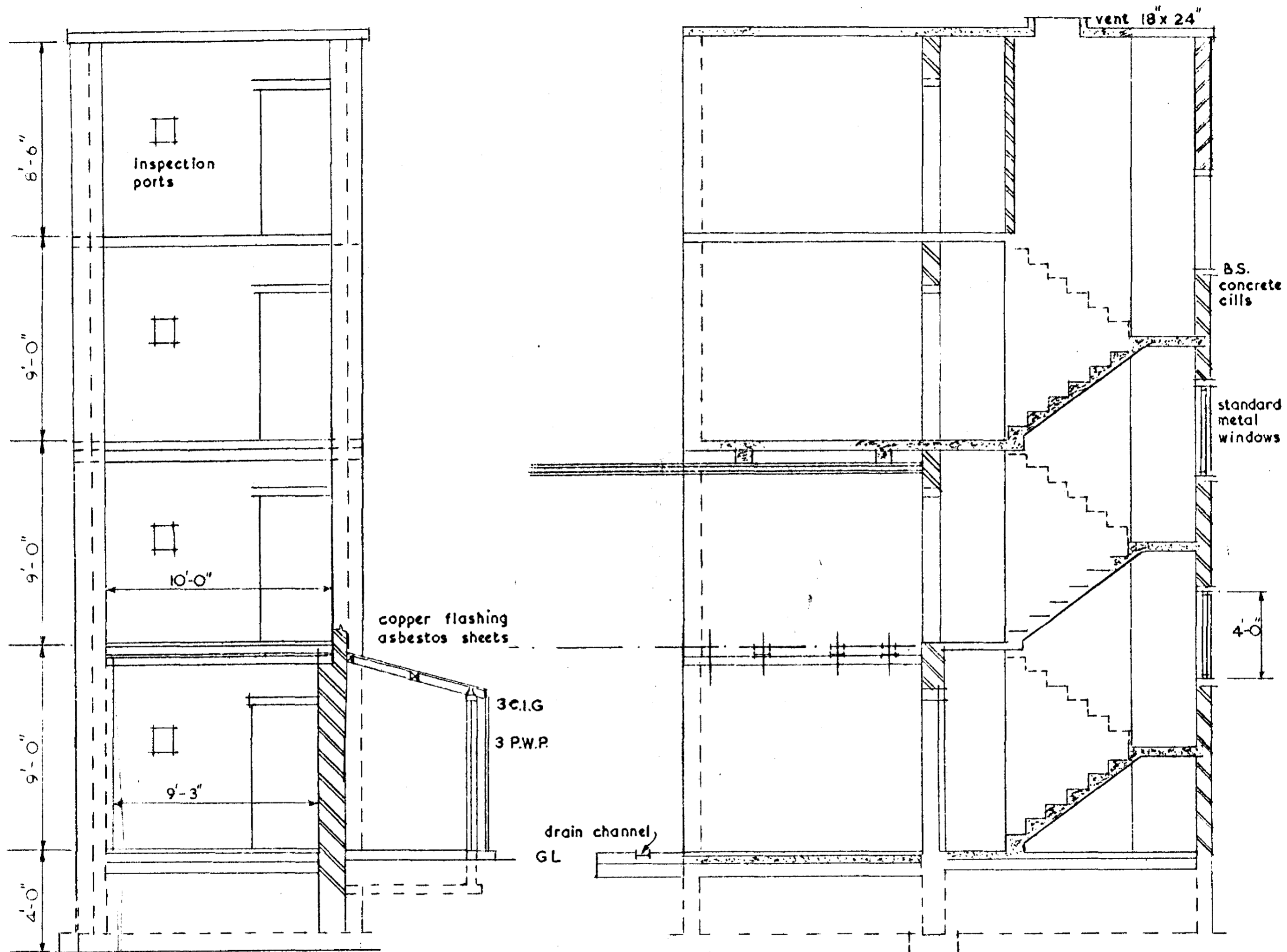
2. The first experiments

The investigation on fire spread in buildings via the windows using models has been reported elsewhere⁽¹⁾. It was realised that the experimental work could be regarded at this stage as tentative only since no correlation had been made with full scale buildings. The Committee was reluctant to accept the results of model tests to form the basis of byelaws without such correlation, and means were sought for carrying out full scale tests. As an immediate measure the London County Council offered to make available derelict property scheduled for demolition, but a survey of the buildings in question convinced the Fire Research Organization that they were unsuitable for the many experiments which were envisaged, and even if the most likely building were used for an outline programme considerable and costly structural alterations would be necessary. Added to these drawbacks were the distance of the property from the Fire Research Station and the inconvenience of having to carry out experiments of this nature in a public thoroughfare. The Committee were unanimously of the opinion that the project of using derelict property should be discarded in favour of erecting a building especially for the purpose of making experiments of fire spread, since full value would not be obtained for money spent on old property.

TABLE. FIRST SERIES OF TESTS IN TOWER BUILDING

Test No.	Conditions in ground floor room	Conditions in rooms above	Conditions in staircase
1	<ol style="list-style-type: none"> Standard furniture low fire load (1). 60% windows opening glazed 	<ol style="list-style-type: none"> 3 ft. separation of 1/2 hr. fire resistance (from both sides). Windows glazed. 	<ol style="list-style-type: none"> Natural ventilation at top of stair well. Door to ground floor room of 1/2 hr. fire resistance.
2	<ol style="list-style-type: none"> Standard crib low fire load. As Test 1. 	<ol style="list-style-type: none"> 3 ft. separation of 1/2 hr. fire resistance externally. No glazing. 	<ol style="list-style-type: none"> As Test 1 Standard doors.
3	<ol style="list-style-type: none"> As Test 2. 60% window opening no glazing. 	<ol style="list-style-type: none"> 3 ft. separation of nil fire resistance (noncombustible). No glazing. 	<ol style="list-style-type: none"> Exhaust fans. To be decided.
4	<ol style="list-style-type: none"> As Test 2. As Test 3. 	<ol style="list-style-type: none"> No separation. Glazing. 	<ol style="list-style-type: none"> Plenum system. To be decided.
5	<ol style="list-style-type: none"> Standard crib medium fire load (2). As test 3. 	<ol style="list-style-type: none"> Separation and fire resistance to be determined. No glazing. 	<ol style="list-style-type: none"> To be decided. To be decided.
6	<ol style="list-style-type: none"> Standard crib high fire load (3) As test 3. 	ditto	ditto

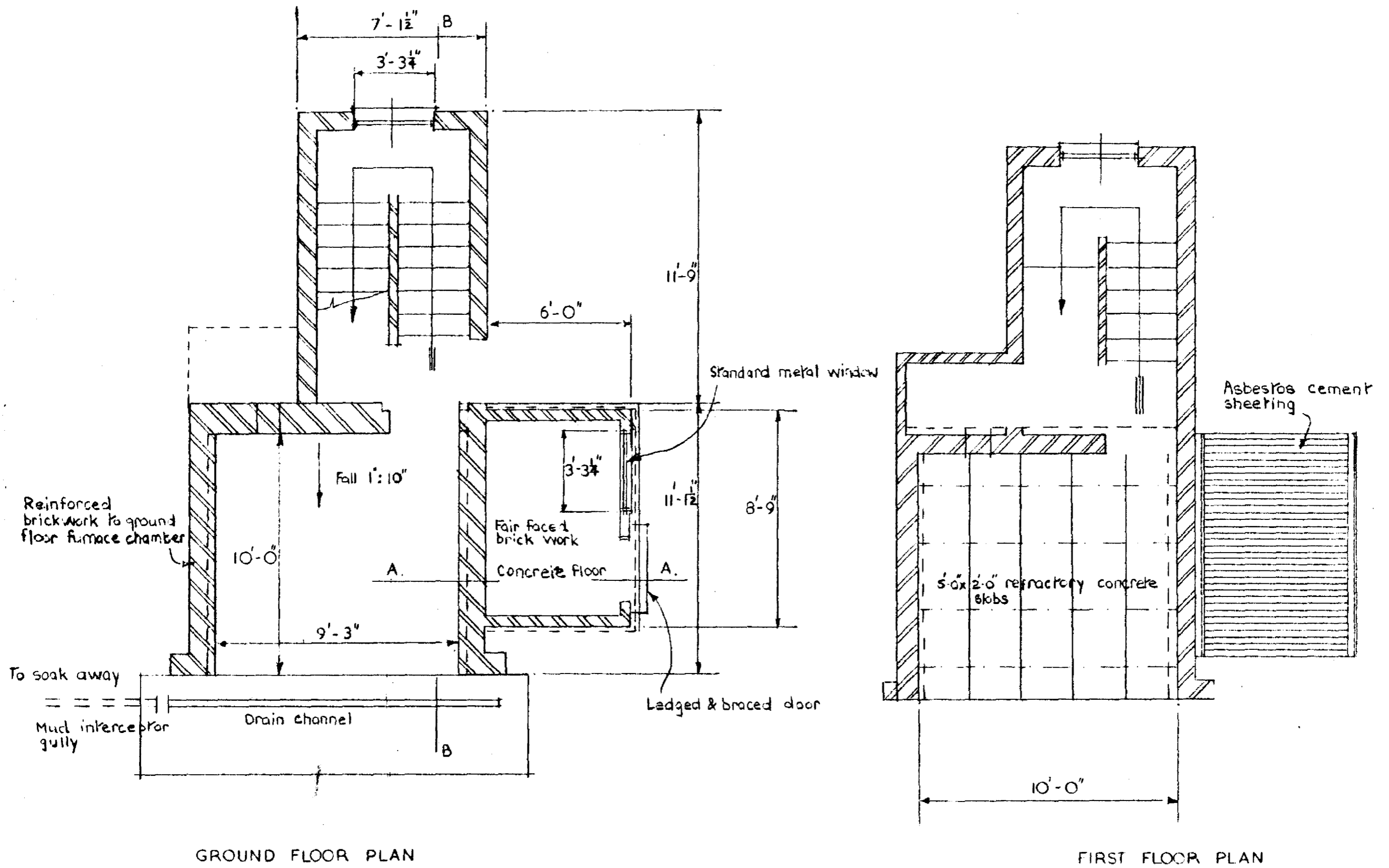
- (1) 5 lb/ft²
(2) 10 lb/ft²
(3) 20 lb/ft²



PART SECTION ON LINE A-A

SECTION ON LINE B-B

FIG. 1a. BUILDING FOR EXPERIMENTS ON FIRE SPREAD



GROUND FLOOR PLAN

FIRST FLOOR PLAN

FIG. 16.