Fire Research Note

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NEW FIRE RESEARCH/TESTING LABORATORY OF THE FORSCHUNGSGEMEINSCHAFT BRANDSCHUTZ, BAD OLDESLOE, GERMANY.

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SUMMARY

This report contains an account of the official opening of a new research and testing laboratory of the Forschungsgemeinschaft Brandschutz in Bad Oldesloe, Germany. A brief account of the circumstances leading to its erection, its purpose and the experimental facilities it incorporates, is given.

Key Words:- Extinguishing, High piled, Hydrogen chloride, Plastics, Sprinkler, Storage.

MINISTRY OF TECHNOLOGY AND FIRE OFFICES' COMMITTEE
JOINT FIRE RESEARCH ORGANIZATION

NEW FIRE RESEARCH/TESTING LABORATORY OF THE FORSCHUNGSGEMEINSCHAFT BRANDSCHUTZ, BAD OLDESLOE, GERMANY.

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1. Introduction

In June 1968 the Forschungsgemeinschaft Brandschutz (Fire Protection Research Association) announced the completion of a new laboratory for the testing of sprinklers and other means of fire extinction. The Fire Research Station was invited to the official opening by Prof. Dr. Ernst Schneider, President of the German Congress of Industry and Commerce on Thursday, 4th July, 1968. The writer attended as the Director's representative.

2. The Official Opening

2.1. The Official Opening, presided over by Dr. Wittenburg, Head of Selbsttätige Feuerlöschanlagen GmbH (commonly known as SFH), was attended by approximately sixty representatives of German industry, Government, Universities and other organisations concerned with problems of fire protection, as well as a representative from each of the Fire Research Station and Fire Offices' Committee.

The initiative for building the new laboratory had come from SFH which, in collaboration with a small number of other firms, had established the Forschungsgemeinschaft Brandschutz to operate and control the new laboratory. The intention is to offer facilities of the laboratory, not only to members of the Forschungsgemeinschaft but to any other potential users on a repayment basis. It is no doubt hoped that substantial users, will in due course become members of the Forschungsgemeinschaft.

2.2. Professor O. Herterich (Director of VFDB) was the principal guest speaker and outlined the history of the fire protection research in Germany which was seen to be a fragmented effort, distributed over more than twenty laboratories in the country, each concerned with some aspect of fire research, and with no central co-ordination. Professor Herterich compared the fragmented effort unfavourably with the co-ordinated research and testing organisation in Britain. He pointed also to Britain, the U.S.A. and Japan as examples of enlightened state support (or proposed support) of fire research.

The current effort, as distributed between 20 laboratories, was said to be:-

49.75 scientists
50.00 engineers
60.25 assistants
14.75 student assistants

at a total annual cost of approximately 6.7 million DM, of which 2.6 million DM represents the cost of personnel. The theme of Dr. Herterich's remaining remarks was the desirability of co-ordination of fire research with state and, if possible, insurance support.

2.3. Herr Job, who is temporarily in charge of the Forschungsgemeinschaft laboratory, spoke next. His theme also emphasized the importance of central direction of fire research and testing. Four firms (unnamed) have joined together to form the Forschungsgemeinschaft Brandschutz and it is proposed to offer a service, on repayment, to all comers. Fire protection falls broadly into two categories - preventive and remedial - and in Herr Job's opinion relatively too much of the available effort is currently devoted to preventive measures. It is accordingly his intention to emphasize the remedial side, viz. fire fighting, extinction etc.

In the flexible building provided for the purpose, it is the Forschungsgemeinschaft's intention to establish conditions where both research and testing can be carried out. The laboratory is presently equipped for work on sprinklers, where the main concern is to determine the effectiveness of sprinklers in controlling fires in high stacked goods. Two high expansion foam generators (each capable of producing $450m^3/m$ of 1000:1 HE foam = ca $15,000ft^3/m$) are available and there is provision for extinction tests using carbon dioxide and high pressure water.

A further main line of investigation will be the corrosive effects of products of combustion of halogen containing plastics, in particular PVC. There have been a number of fires in Germany in which the reinforcement in concrete has been severely corroded by HCl, a problem which is causing widespread concern in the country. This work will be carried out by Dr. Jach of Kiel, to whom space in the new laboratory will be allocated. Dr. Job showed a report which has been produced on the corrosion problem, with examples of damage caused in actual fires, and promised that a copy would be made available to the overseas visitors.

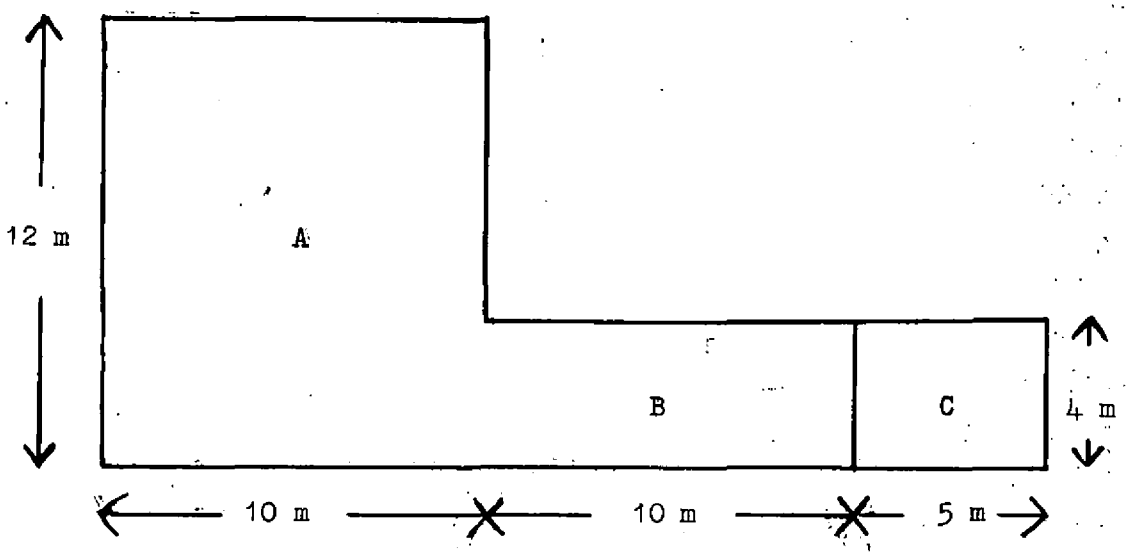
Future plans for the Forschungsgemeinschaft include open site work on oil fires - a monitor for foam and water is provided for this purpose on the roof of the new laboratory - and on the toxic and corrosive products of new building materials. A further laboratory is planned - it was said that a start would be made on this within the next month or two - the dimensions of which would be 20m x 40m x 6m high and this

would be used for fire tests on plastics, as well as sprinklers, detectors and extinguishers. The planned new laboratory is to be sited adjacent to the existing laboratory and the two are to be connected by a 10m wide viewing gallery which will have two directional viewing and from which experiments in both laboratories will be capable of being observed.

2.4. Herr Job was followed by Prof. Schneider, who made a short formal speech of good wishes after which the assembled party moved to the approaches to the new laboratories where a ribbon was ceremonially cut to the accompaniment of music from a fire brigade band.

3. The New Building

3.1. A schematic elevation of the new building is shown below, and a general view in Fig. 1.



The external frame is of RSJ's on a 5m module, strapped horizontally at 2.4m intervals, and with a roof frame also of RSJ's, but lighter calibre, at 5m in one direction and $2\frac{1}{2}$m intervals in the other. At various points there are diagonal strengtheners. The cladding is of galvanised corrugated sheet steel, internally fixed to form both walls and roof (Fig. 2).

Sections A and B, each of floor area 10m x 10m and of height respectively 12m and 4m, comprise the experimental area. There is no partition between A and B. Section C, 5m x 10m x 4m high, is the instrument and control room.

Access from Section C to Section B is by personal door and good visibility is provided via an observation window, virtually the whole width of the partition between them. A similar observation window is provided at the far end of A for viewing from outside. Access from outside is by four double doors, one each in Sections A and C and two on opposite sides of B, the dimensions of which are approximately 3m x $2\frac{1}{2}$m high.

There is a public address system, both inside and outside the building, with a long trailing microphone lead to allow the speaker to be located anywhere inside or within reasonable distance outside the building. The outside of the experimental parts of the building is provided with a water cooling system capable of delivering 1800 l/min either directly from the town main, or by means of an electric pump from a static water tank. A reserve pump operated by an i.c. engine is available in case of emergency resulting from an electricity failure. (Fig. 3).

Provision for ventilation and smoke clearance of the building is by means of smoke vents, 4 on each side of Section A (just below ceiling level) of dimensions approximately 1 m x $1\frac{1}{2}$m. These are manually controlled from the outside. The foam generator fans are also used for smoke clearance. There is no provision for storage of equipment and no special drainage facilities, nor provision for foam dispersal. Six tier racks, reaching to the top of Section A, are to be used for high stacked storage experiments.

3.2. Experimental Facilities. The laboratory is provided with installation for the following:-

Sprinklers; liberal provision for the placing of pipework in Sections A and B for sprinkler installation. Capacity 120 l/min.

Water curtain between Sections A and B. Capacity 60 l/min.

High pressure water spray; Capacity 80 l/min at 8 atm.

CO_2 extinction; a 3000 kg CO_2 holder is located in a lean-to on one side of Section C, to hold liquid CO_2 at $-20^{\circ}C$ and 20 atm. From this, CO_2 can be piped into Sections A and/or B, and also into a further small experimental room - which is no more than a

wooden hut 9m x 4m x 2.5m high, divided into two compartments - in which actual fire experiments with CO_2 extinction are carried out. Ten seconds before the release of CO_2 an audible warning is sounded to warn personnel to evacuate. (Fig. 4).

Water/foam monitor; roof mounted (on A) for field tests on liquid fires. Capacity 1600 l/min.

H.E. foam; two 1000:1 HE foam generators, each of capacity 450m^3/min feed foam into Section A. One is located at ground level, the other at 4-5m, situated on the roof of Section B. The latter can be seen in Fig. 1. Demonstrations were carried out using each of these facilities. (Figs. 5, 6, 7).

3.3. Control and Measurement

The measurement and control facilities, which are neither extensive nor sophisticated are housed in Section C of the building. The operator sits at a console, where the operation of the various experimental facilities can be controlled, and recording meters read, and to which a good view of Section A and B is presented through the observation window. (Fig. 8). A series of pressure gauges indicate compressed air pressures on all lines via which operation of sprinklers etc. are remotely controlled. Simple temperature indicators and a temperature recorder present the air temperatures measured at 10 positions at about 10cm below the ceiling in A, and a further 10 in B. Each position has two thermocouples so that each position can be visually monitored and recorded simultaneously. The temperature recorder has 3 ranges 0-250, 0-400 and 0-900°C, and six channels which can be automatically switched at 2 sec. intervals. There is no provision for measuring structural temperatures, nor has any calculation been made of temperatures likely to be reached on the structure.

Water and foam compound tanks and pumps are also situated in the control room, in which minimal bench space is also provided.

3.4. There is no provision for access to the upper parts of the building other than ladders, and a portable beanstalk. There is no lifting gear installed in the building, but a fork lift truck is available.

3.4. The building had been conceived and designed in 4 months and building operations completed in a further 4 months, i.e. 8 months in all. In contrast to this remarkably short time the cost, DM 250,000 (equivalent to £25,000) seemed to be relatively high.

4. Organisation and Staff

The new laboratory belongs to the Forschungsgemeinschaft Brandschutz which is still very young and at present has no staff of its own. The immediate intention appears to be to run the laboratory with SFH staff and effort, Herr Job being temporarily in charge. It is eventually intended to appoint a Director, with about 6 technicians and 6 assistants, but the plans for staffing seem to be rather fluid at present.

5. Comment

This is a useful facility, erected primarily to meet two urgently felt needs, viz. to study the problems of high stacked storage and the corrosive effects of halogenated products of combustion from plastics materials. As a bonus, it is being used to demonstrate the strength of the feeling among German fire researchers and technologists, on the need for a co-ordinated approach to fire problems and to stimulate Governmental and insurance support probably along the British line. Having been conceived and erected in a very short time, it has naturally some limitations, and when used to study a wide variety of problems, will no doubt lead to the need for some improvisation. Despite this it is a striking example of what can be achieved in very short time when a need is clearly seen, and the action rests in the hands of men with drive and initiative. They are to be congratulated on a very substantial achievement.

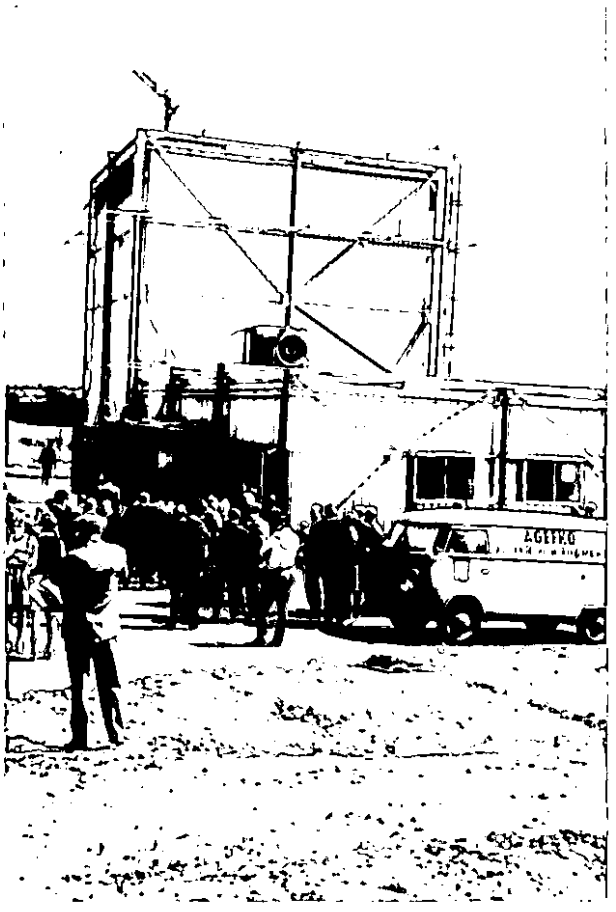


FIG. 1. FORSCHUNGSZENTRUM BRANDSCHUTZ
NEW LABORATORY.

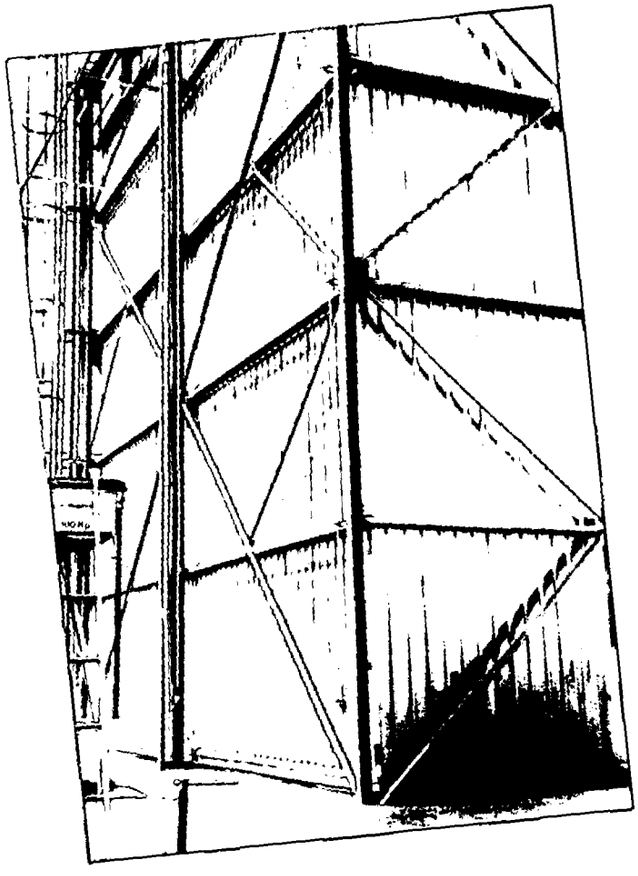


FIG. 2. STEEL FRAME CONSTRUCTION AND CLADDING

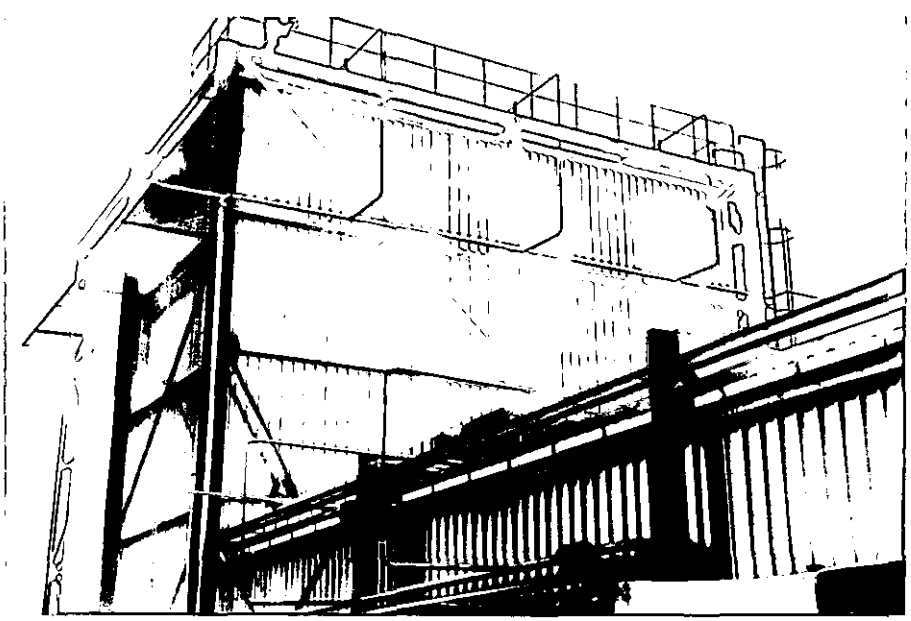


FIG. 3. WATER SPRAY FOR COOLING

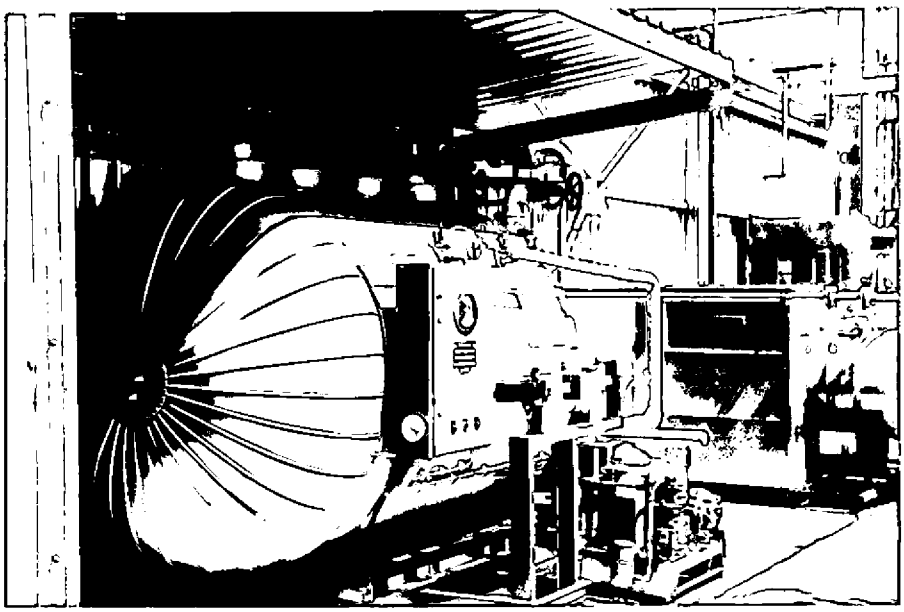


FIG. 4. LIQUID CO_2 CONTAINER

FIG. 5. INTERIOR VIEW

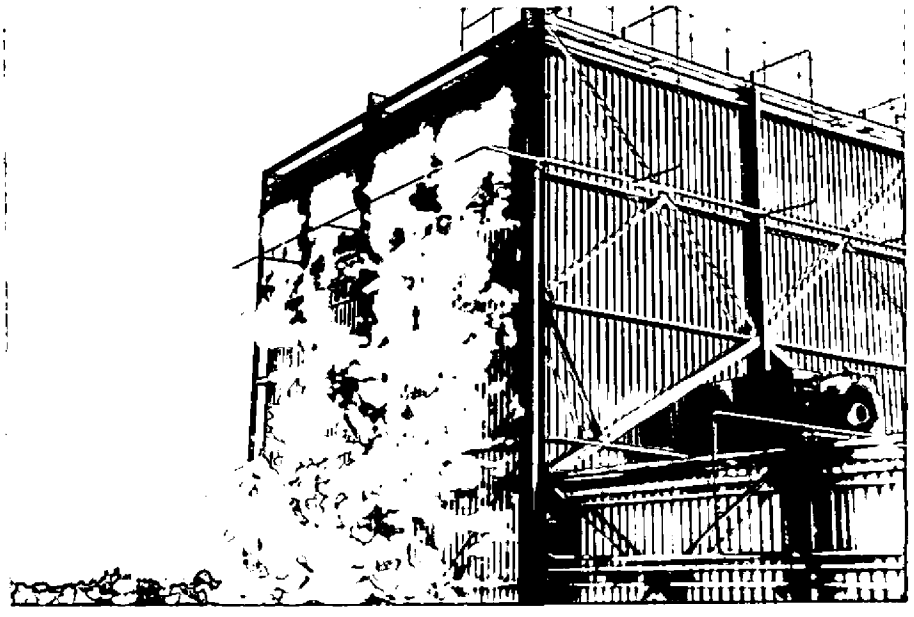


FIG. 6. HIGH EXPANSION FOAM

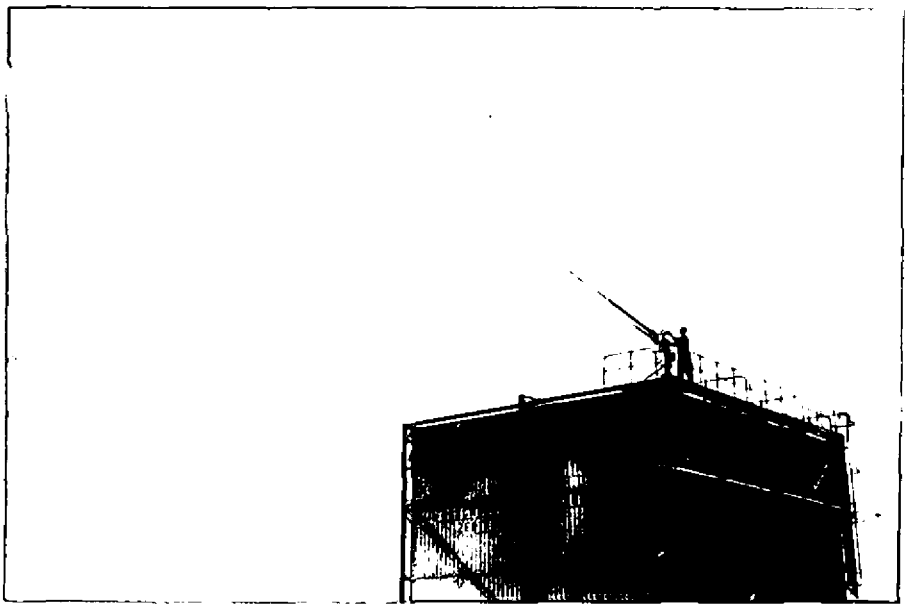


FIG. 7. ROOF MOUNTED MONITOR SPRAYING FOAM

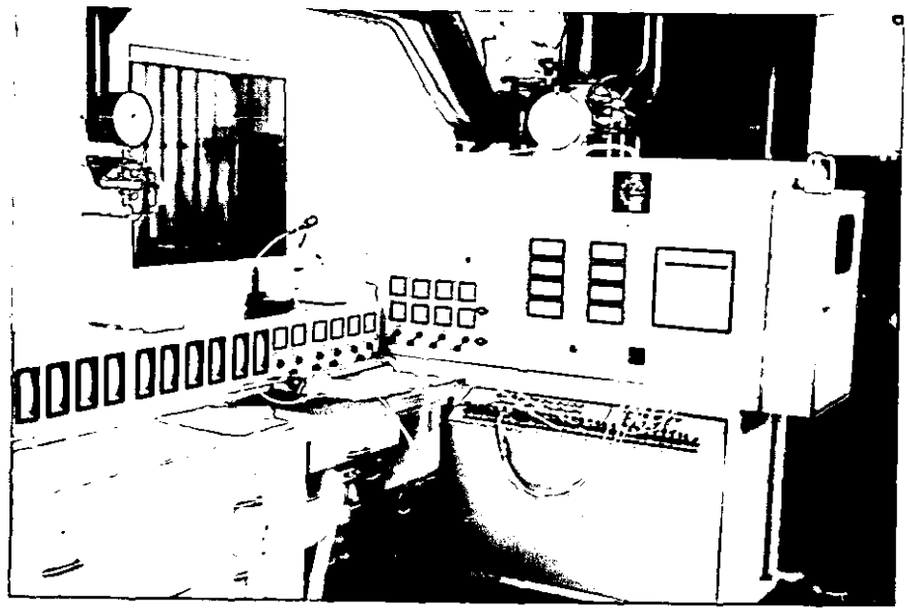


FIG. 8. CONTROL AND INSTRUMENT ROOM