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ECONOMIC INTELLIGENCE REPORT

CIVIL DEFENSE AND SHELTER CONSTRUCTION IN HUNGARY

CIA/RR 59-2
January 1959

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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FOREWORD

This report has been compiled largely from information furnished by Hungarian refugees. For this reason it principally shows the status of some civil defense preparations at the time of the Hungarian uprising, October-November 1956. The amount and type of preparations made, particularly in the construction of heavy air-raid shelters, are believed to be significant. The air-raid shelters, which are the most costly civil defense items, undoubtedly are still in place and are presumed not to have been extensively damaged. Some reorganization as well as renewed civil defense training has recently been reported.

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CIVIL DEFENSE AND SHELTER CONSTRUCTION IN HUNGARY*

Summary and Conclusions

Before the uprising of October-November 1956, Hungary had developed an extensive civil defense system which was monitored and guided in most respects by the USSR. Evidence indicates that the Hungarian civil defense program, although disrupted by the revolt, is now being reestablished and that its training is being directed toward defense against nuclear weapons.

Civil defense in Hungary and in the Soviet Bloc differs in concept from civil defense in the US in the following ways:

1. The Hungarian civil defense program is carried on without publicity and without clearly visible evidence. Civil defense signs have not been reported, as Hungarian instructions require their posting only on notice of an air alert. Western observers have reported evidence of the construction of air-raid shelters or small-scale drills only in rare instances. The construction of shelters has been concealed, and civil defense publicity has been largely limited to special manuals and civil defense instruction courses.

2. The Hungarian civil defense program operates under security restrictions. [redacted] 50X1
[redacted] Insofar as is known, civil 50X1
defense officials have not been identified in the Hungarian press, and refugees tell of classified training instructions and building plans.

3. Possibly for security reasons, Hungarian authorities are reluctant to give full information to the Hungarian public on the probable effects of nuclear weapons. Although planning since 1952 is known to have been based in part on the effects of atomic weapons, the information which was generally available on civil defense before 1955 avoided the subject of the effects of atomic weapons. One article on atomic civil defense planning is known to have been published since the revolt of 1956, but this appeared in a specialized military periodical, not in the popular press. The Hungarian citizen probably does not know the size of the areas of blast damage from the larger nuclear weapons or the size of the areas of contamination and the possible persistence of radioactivity from nuclear weapons in general.

* The estimates and conclusions in this report represent the best judgment of this Office as of 1 November 1958.

4. It seems evident that Communist authorities emphasize control and do not intend to grant mobility to the population in the event of air attack. All known civil defense instructions advise the population to take refuge in nearby shelters in case of attack.

5. A priority system has been used in Hungary for setting up air-raid shelters and organizations for air defense. The heaviest shelters and the earliest training were provided for installations of the government, of transport and communications, and of important industries. [redacted] in the event of air attack, 40-percent casualties were expected among the general public but only 10 percent among the industrial labor force -- an apportionment which probably reflects the priorities that have been set up for these segments of the population. 50X1

6. Civil defense in Hungary, which is centrally controlled and monitored by the USSR, has used compulsion in varying degrees to insure enrollment in organizational units and participation in training.

The organization of civil defense in Hungary, which is under the Ministry of the Interior, includes a corps of staff officers assigned at various governmental levels for planning and direction. Both military personnel and civilian specialists are employed.

The more significant aspects of Hungarian civil defense preparations include the following:

1. Efforts to develop civil defense are on a long-term basis. The staff organization as well as the construction of air-raid shelters and the conduct of training courses dates back to 1949.

2. The construction of heavy air-raid shelters has been widespread in Hungary. Bunkers with 16-foot ceilings and 10-foot walls of reinforced concrete are frequently reported. It is estimated that between 100 and 400 of these structures exist in Hungary, with an average capacity of 10,000 persons. Supplementing, or built in place of these, are a number of underground tunnel and gallery systems in Budapest and elsewhere. Several munitions plants have shelters of the latter type.

A universal order to build air-raid shelters in the basements of large new masonry buildings has been in effect in Hungary, as in other countries of the Soviet Bloc, since about 1949. The construction of these shelters has been frequently reported. The refurbishing of World War II shelters and the construction of new shelters of the basement type in older buildings have also taken place.

If new construction of state and subsidized housing since 1950 has included shelter generally, more than 300,000 Hungarians may have been provided with new shelters of the basement type. No estimate can be made of the amount of usable basement shelter remaining from World War II or of that newly constructed in older masonry buildings.

3. Special civil defense battalions somewhat like national guard units were formed and trained during 1954-56.

4. Training of workers for civil defense has been widespread in Hungary since about 1951. This training has been compulsory and has taken place principally in government offices, institutions, and important industrial installations.

5. There can be no doubt that Soviet advisers have had a major role in directing the Hungarian civil defense program.

It must be concluded that the Hungarians, under Soviet direction, have conducted a serious and costly effort to develop civil defense. The volume of construction of heavy shelters and the efforts to maintain secrecy tend to negate any argument that Hungarian preparations for civil defense have been conducted solely for psychological effect in order to reassure the population. Rather, it appears that a serious effort has been made to afford good protection for those elements of the population which would be considered militarily important -- that is, governmental control personnel, transport and communications workers, and workers in essential industry. At the same time, a continuing policy has been in effect to provide increasing numbers of the urban population with limited protection such as basement shelters in suitable masonry buildings.

Numerous links and similarities exist between civil defense in Hungary and that in the USSR and other countries of the Soviet Bloc. It may be suspected, therefore, that other important Bloc countries, particularly the USSR, have implemented civil defense measures similar to or better than those reported from Hungary.

I. Organization.

A. Soviet Guidance.

By 1952 the USSR had assumed the role of leadership in the preparation of measures for air defense of the principal European Satellites. By that time, Soviet commissions were sent to the various Satellites to

standardize and organize their air defense. 1/* The parallels which have developed between Satellite and Soviet civil defense are evidence that Soviet guidance has been a dominant factor in the Satellite systems. [redacted] 50X1

[redacted] 50X1

[redacted] In addition, Hungarian civil defense officials have visited the USSR for extended periods. 2/ Because of this known Soviet leadership and because of similarities in the civil defense preparations of the various countries of the Soviet Bloc, additional credence can be given [redacted] 50X1 regarding Hungarian civil defense if similar measures have been detected in the USSR or in other countries of the Bloc.

B. Command.

The Ministry of the Interior (Belugyi Miniszterium), under the Council of Ministers, is responsible for civil defense in Hungary. 3/ (For the organization of civil defense in Hungary, see the accompanying chart, Figure 1.**) The national civil defense headquarters (Legoltalom Orszagos Parancsnoksaga -- LOP) is located at the Ministry building. 4/

It is estimated that command and staff personnel for civil defense in Hungary total between 400 and 500 military officers selected by and assigned to the Ministry of the Interior. Technically trained civilian architects, engineers, and other specialists are also employed. 5/

Civil defense officers wear khaki uniforms with green epaulets. Crossed bombs are said to be worn as the service insignia on green collar patches, 6/ although engineer insignia have also been observed on troops taking part in civil defense exercises. 7/

Subordinate to the LOP are civil defense headquarters in counties, and under these are civil defense headquarters in cities or towns.

C. Cities and Counties.

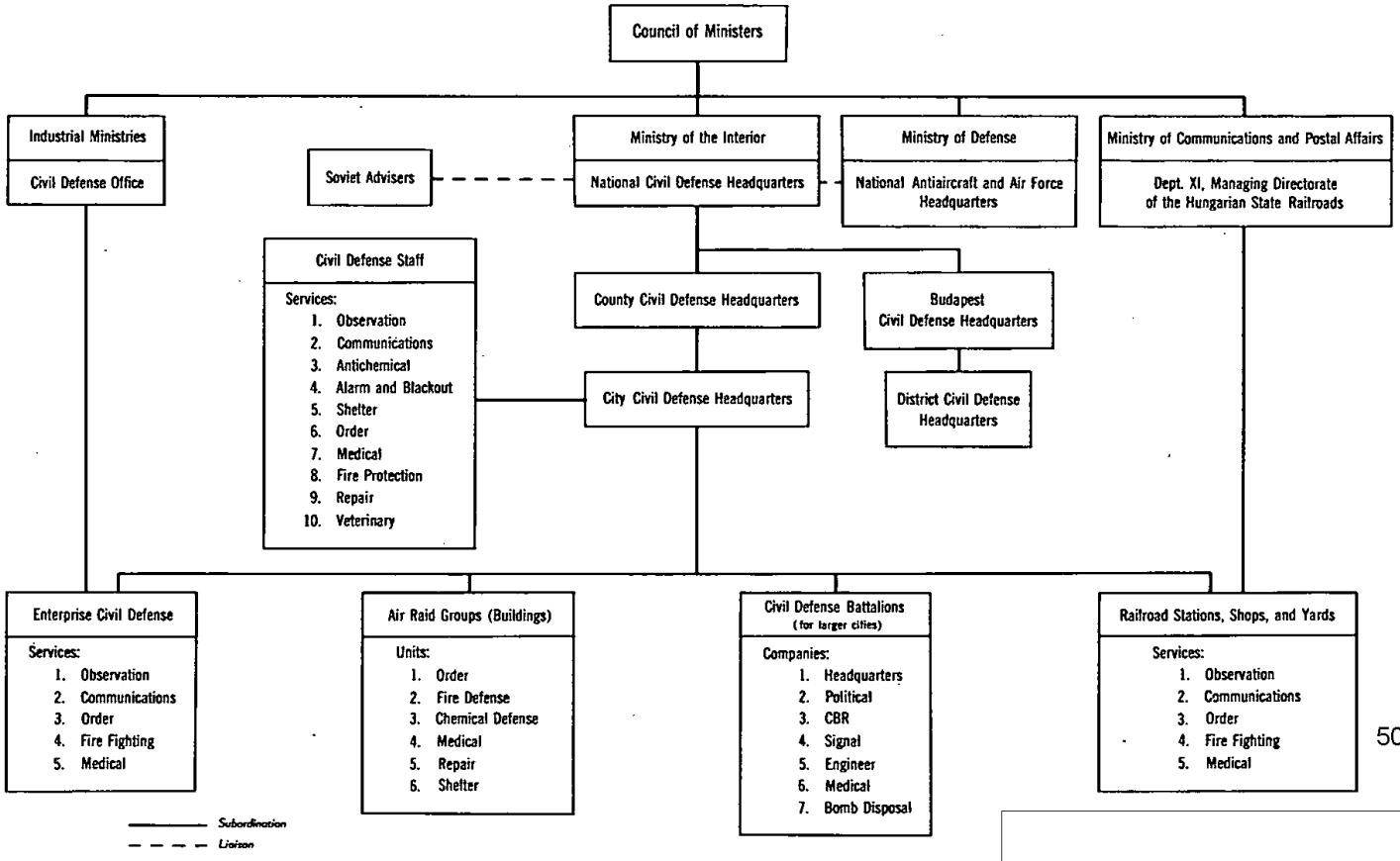
The commander of civil defense operations in a city or county is nominally its highest ranking civilian authority -- the president of

[redacted] 50X1

** Following p. 4.

Figure 1 50X1

HUNGARY: CIVIL DEFENSE ORGANIZATION



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the council or the mayor in a city and the town notary in a village. 8/ A full-time civil defense staff* is assigned, however, in each county and in each city having a mayor and a city administration. 9/ Such staffs are commanded by lieutenant colonels or majors in counties and by captains or first lieutenants in cities. 10/ In 1957 the mayor of Budapest had a lieutenant colonel serving as the civil defense commander or chief of staff. Each district of Budapest has several officers assigned to an air-raid defense staff. 11/ The staffs of the operational units and their commanders are reported to perform the following functions 12/:

1. All administrative work related to civil defense operations.

2. Procurement and handling of supplies.

3. Registration and training of personnel.

4. Supervision of the execution of published civil defense orders.

Additional members of the city civil defense staff reportedly include a finance officer, a supply officer, a medical officer, a director of troops (in charge of rescue squads and clearance of debris), a director of fire fighters, a director of antichemical and decontamination groups, and a veterinary. 13/ Some functions, such as supply, probably will require the services of a full-time civil defense supervisor, but other staff leaders probably are drawn from existing organizations. These might include the senior medical officer, the fire chief, and others whose functions and organization fit logically into civil defense. In one city the employment of a political officer has been reported. 14/ It is believed that full-time civil defense staff officers are not employed below the city headquarters level (or possibly below the district headquarters level in Budapest).

The units controlled by city civil defense headquarters which are to operate in an emergency have not yet been clearly defined. A Hungarian civil defense manual of 1952 describes the organization and operation of public civil defense** in the following manner. 15/

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** The term public civil defense refers to the functions of civil defense operational units and staffs at the city level or above -- that is, in cities, counties, and the larger enterprises. In contrast, the term publicly directed individual civil defense refers to civil defense or self-defense units formed from workers or residents in smaller enterprises, dwelling areas, or smaller towns.

The main task of the public civil defense organization is to prevent or repair damage in public areas. In general, it is responsible for salvage work and rescue operations performed in the interests of the "working people." This operation requires unified leadership and execution within the area of a single town, city, or county. Another task of public civil defense is to attend to all rescue operations which surpass the capacities of those civil defense organizations that are in individual enterprises or plants and dwelling houses (that is, the publicly directed individual civil defense organizations) in order to insure the effective performance of their duties. Local city and county councils have jurisdiction over public civil defense as well as over the organization and direction of publicly directed individual civil defense.

The civil defense headquarters of a city is organized under the local council and is in charge of the management and control of local civil defense services. The civil defense staff, in the civil defense headquarters, is under the direction of the president of the local executive committee (mayor), who is also the local civil defense chief. In practice, the operations of the civil defense staff are directed by the civil defense chief of staff. The work of the civil defense staff is supported by technical lecturers such as engineers, chemists, physicians, and fire-guards. Damage caused by an air raid is repaired by civil defense units centrally directed by civil defense headquarters.

The civil defense center of a city is located in an air-raid shelter, which is furnished with technical equipment and is protected against enemy attack. From there the activity of the civil defense organization of the city is directed by the civil defense staff during the entire emergency period commencing with the ordering of an alert.

When a civil defense alert is ordered, part of the personnel assigned to the civil defense headquarters (officials, messengers, and telephone operators) must remain on permanent duty at the center. In case of an air alarm the entire personnel, including the technical lecturers, must report to the center and perform their assigned duties there. The civil defense headquarters obtains information about the air raid through communications equipment and through messengers and then gives instructions to the subordinate units, directing them to the scenes of damage. The civil defense headquarters has special service units at its disposal for repairing the damages caused by an air raid, as follows:

1. The observation and reconnaissance service reports incidents connected with an air raid to the civil defense headquarters.

2. The signal service maintains steady communications with the civil defense center and its subordinate civil defense organs as well as with civil defense and political organizations and other authorities.

3. The chemical or antigas service is in charge of locating the places when gas attack has occurred and of preventing ill effects.

4. The alarm and blackout service must alert the civil defense organization in case of the danger of an air raid and must inform the civilian population of the existence of the danger as well as its passing. This service must be performed efficiently and accurately and must also enforce full compliance with blackout regulations.

5. The housing and shelter service is entrusted with the protection of the lives of the civilian population. Its tasks include the following: to locate and keep in repair the private and public air-raid shelters remaining from World War II; to post the number of people to be accommodated by each shelter; to initiate, in the event of a civil defense alert, preliminary proceedings for the evacuation* of cities, towns, or other endangered areas; to transform suitable cellars into air-raid shelters; to make suggestions to the authorities about repairing damaged air-raid shelters; to provide housing for persons and families who have become homeless; to make a record of and to assist those of the civilian population who have suffered material losses in consequence of an air-raid; and to maintain public air-raid shelters and their equipment.

6. The service in charge of maintaining public order must perform not only the duties of the peacetime police but also those tasks which may occur in connection with public order and security during a civil defense alert as well as during and after an air attack. It must also watch public air-raid shelters and maintain order in them.

7. The medical service must locate persons injured by an air raid, give them first aid as well as medical aid, and move them to a sheltered place and care for them until such time as they can be transported to a first aid station or to a hospital where they can be given complete medical attention.

8. The fire protection service has a twofold duty: first, fire prevention, or taking measures to prevent the spreading of fires caused by incendiary bombs (for example, clearing attics and impregnation

* Children, bedridden invalids, and the like are the only groups suggested for evacuation.

with fire-resistant substances), and, second, extinguishing fires caused by incendiary bombs and rescuing persons, animals, and objects from such fires.

9. The repair, technical aid, and rubble-clearing service is to be used to diminish the effects of damage caused by enemy air attack and to reestablish as soon as possible the normal course of city life and the continuity of production in plants. In connection with these duties it must rescue persons and goods (machinery, technical equipment, raw materials, and the like) buried under the ruins of buildings destroyed by an air raid or blocked in shelters; prop up or pull down damaged sections of buildings; repair minor damage in buildings; repair damage to transportation lines, bridges, public utilities (water, gas, electricity, drain pipes, and the like); neutralize unexploded bombs and other ammunition; and, finally, bury persons killed by air attack.

10. The veterinary service must protect animals from the consequences of air attack -- splinters, fire, and the poisoning effects of chemical warfare -- as well as provide veterinary treatment for injured animals. In case of severe injuries it must perform emergency slaughter and must decide whether the meat is suitable for consumption or industrial purposes.

[redacted] 50X1

A significant development, however, has been the initiation of civil defense battalions (legoltalmi zaszloalj) in Hungary 17/ similar to national guard units. [redacted] 50X1
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The precise assignment and missions of the civil defense battalions are not clear. Their functions (in most cases duplicating those of the city services) may be deduced from the titles of the component companies. They therefore appear to represent auxiliary groups which may act as disaster relief columns. [redacted] 50X1
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[redacted] Each battalion was to have more than 400 men and approximately 9 officers -- a battalion commander and executive officer plus 7 company commanders. 21/ A Budapest civil defense battalion was described as having the following companies: headquarters, political, CBR (chemical, bacteriological, and radiological), signal, engineer, medical, and bomb disposal. [redacted] 50X1

[redacted] 50X1

[redacted] The medical 50X1
company was reported to include no doctors, making it likely that professional medical personnel would be called to support the battalions when an emergency situation warranted such action. At least one civil defense battalion was on duty in Budapest at the outbreak of the 1956 uprising. Its barracks were reported to be located on the road to Dunakeszi, a suburban town north of Budapest. 23/ In 1954, another or the same battalion had an office in the city hall. 24/ Other cities at which civil defense units allegedly were to be stationed included Gyor, Miskolc, Pecs, Szeged, Szekesfehervar, Diosgyor, and Debrecen. 25/ Men from all of these cities were reported to have attended a summer training camp in 1956. 26/

D. Industrial Enterprises.

In major offices and industrial plants or enterprises the manager is trained in civil defense and is responsible for civil defense preparations. He is assisted by other workers who are specially trained. 27/ In major plants a full-time civil defense director is assigned. 28/ Plant civil defense preparations are directed and administered by special offices within the parent ministry. 29/

Operational civil defense services within plants include the following: (1) an observation unit charged with spotting aircraft and reporting damage, (2) a communications unit to maintain civil defense communications, (3) an order or safety unit to supervise movement to shelter and to supervise the execution of air-raid precautions such as shutting off utilities, (4) a fire-fighting unit consisting of a plant fire brigade and auxiliaries, and (5) a medical unit consisting principally of women who have received some medical training. 30/ Local city civil defense headquarters probably monitor civil defense preparations in peacetime and assume operational control in time of emergency.

E. Railroads.

The organization of Hungarian railroads for civil defense is not clear. A "Department XI" has been confirmed at the Managing Directorate of the Hungarian State Railroads. 31/ This department is charged with military liaison, preparations for mobilization, and civil defense. It was headed by a colonel before the November 1956 uprising. Civil defense training has been reported to be well advanced in railroad installations, and the usual functional teams probably are organized in stations, yards, and shops. First aid, repair, and observer groups in stations [redacted] 50X1

F. Dwelling Units.

The organization of air-raid groups (legoltalmi osztagok) in buildings used as dwellings was ordered in Budapest in 1952. 33/ These are "volunteer" units headed by a trained warden or block leader. 34/ In Nagykanizsa, with a reported population of 33,000, there were 120 units of 46 persons each, 35/ indicating an organized self-defense group for every 275 urban dwellers instead of the prescribed 300. Six units are organized within each self-defense group, as follows: order, fire defense, chemical defense, medical, repair, and shelter. 36/

II. Paramilitary Organizations.

The paramilitary training organization active at the start of the Hungarian uprising was the Hungarian Voluntary Home Defense Federation (Magyar Onkentes Honvedelmi Szovetseg -- MOHSZ, sometimes abbreviated as MOHOSZ). 37/ It was later abolished, but its functions have reappeared in a new organization, the Hungarian Home Defense Sports Federation (Magyar Honvedelmi Sportszovetseg -- MHS). 38/ Information on the latter is limited, but it is expected that organizationally and functionally MHS will be similar to the older MOHSZ and to other Soviet Bloc paramilitary societies. The latter are modeled after the Soviet Society for Cooperation with the Army, Air Force, and Navy (Dobrovol'noye Obshchestvo Sodeystviya Armii Aviatsii i Flotu -- DOSAAF) and acknowledge its leadership. 39/

A. History.

In 1950 the Hungarian Freedom Fighters Federation (Magyar Szabadsagharcos Szovetseg -- MSZHSZ) was formed. 40/ This paramilitary society reached a strength of about 150,000 41/ by 1954. It had a national headquarters and a presidium with subordinate secretariats at county (megye) and town levels. The society operated primary organizations (alapszervezetek), which were organized in industrial plants, villages, producer cooperatives, and the like. Membership was on an ostensibly voluntary basis, but recruiting pressure was exerted on industrial workers. It was apparent that military training of the basic type was to be given members of the MSZHSZ, following which they were free to choose activity in an advanced military specialty. 42/

The formation of MOHSZ in February 1955 was accompanied by some fanfare. It involved the merger of MSZHSZ and the Hungarian Aviation Federation (Magyar Repulo Szovetseg -- MRS). 43/ The initial presidium group included well-known leaders from the police, sports, the Communist Party, trade unions, the Red Cross, and other organizations. 44/ The new federation held its first national conference in July 1955. 45/ An announced goal of the association at that time was a membership of 1 million. 46/

On the occasion of this conference of MOHSZ, the Hungarian Minister of Defense stated that any person who imagined that the danger of war was past was deceiving himself with pacifist illusions and that to meet the needs of national defense MOHSZ should be expanded. 47/ At the conference, MOHSZ was given the task of arranging training for civil defense, and the statement was made that greater attention should be given to this training and to the organization of civil defense groups. 48/

B. Mission.

A fourfold mission of MOHSZ was apparent in Hungary, as follows: (1) to give premilitary training to youths approaching draft age 49/; (2) to permit interested persons to gain useful military skills in such fields as glider flying, vehicle driving, radio operation and maintenance, parachute jumping, and partisan combat training 50/; (3) to disseminate political propaganda among the members 51/; and (4) to assist in civil defense organization and training through air defense schools, local courses, 52/ and appropriate publications. 53/

MOHSZ conducted courses in civil defense for key civilian personnel in principal Hungarian cities. Instructors included Army personnel and qualified civilians. Following graduation from a 3-month course the civilians in turn organized small classes in their home areas. Subjects of instruction included maintenance of order, fire fighting, communications, sanitation, repair of buildings and utilities, the air-raid alarm system, air-raid discipline, inspection of air-raid shelters, and BGS* defense. 54/

C. Organization.

MOHSZ was a mass organization in Hungary and therefore was subordinate to the Communist Party according to the usual Communist pattern. 55/ Its central administration probably was nominally directed by a presidium elected by its national conference. 56/ [redacted] the organization's activities were actually directed by the national chairman of MOHSZ and his staff under the guidance of the Hungarian Minister of Defense. 57/ 50X1 50X1

The national headquarters of MOHSZ employed a large, partly military staff estimated to be 400 persons. 58/ Subdivisions of the headquarters were not clearly defined. Staff divisions reported include a Transportation Department, a Technical Department, a Flying Department, a Technical Inspections Department, a Communications Department, 59/ a division of reserve officers, 60/ and a partisan branch. 61/ In view of the fact that MOHSZ was assigned premilitary training and civil defense roles, it seems probable that central offices would also have been maintained to direct these activities.

* See the first footnote on p. 19, below.

County headquarters of MOHSZ directed the work of the clubs and probably of the primary organizations in their areas. 62/ One county headquarters was reported to employ about 5 military officers and 2 or 3 civilians. 63/ Each city also had MOHSZ headquarters subordinate to the county headquarters. 64/

The lower units of MOHSZ included premilitary centers in urban districts and country villages, 65/ primary organizations (those on the lowest level), 66/ and clubs such as those for aviation, vehicle operation, motorcycling, 67/ and radio amateurs. 68/

D. Membership.

The total membership of MOHSZ in Hungary was not made public. Inasmuch as its predecessor (MSZHSZ) had a membership of 150,000, MOHSZ may have attained a membership of 200,000 or 300,000. This estimate is complicated by a report that there were two types of members -- active or participating members and inactive or nonparticipating members. Age limits for active membership were 16 to 35, while inactive members were accepted to age 60. Dues in either case amounted to 1 forint monthly. 69/

The membership of MHS, the present paramilitary organization, cannot be estimated. It undoubtedly is modest because of the government's insistence on political indoctrination 70/ and the desire to avoid "mistakes" which led MOHSZ members to take part in the 1956 uprising. 71/

E. Activity After November 1956.

There is no doubt that military and partisan-trained members of MOHSZ played an embarrassing part in the 1956 uprising in Hungary. 72/ The dissolution of the organization was announced on 8 January 1957, when the government authorized the separate operation of the Hungarian National Aviation Federation (Magyar Nemzeti Repulo Szovetseg -- MRSZ) and of MSZHSZ. 73/ An effort has been made to reestablish the training disrupted by the uprising. Notice was given in the press of renewed driver, radio, motorcycle, and mechanic training early in 1957. 74/ MRSZ also renewed flight training and related activities. 75/

In August 1957 a conference of leaders of a new organization was held -- the Hungarian Home Defense Sports Federation, or MHS. The conference proposed the reuniting of MSZHSZ and MRSZ, 76/ which was actually announced on 19 September. 77/ The preliminary conference made it clear that MHS is to be more closely monitored than the old MOHSZ. Party guidance and political indoctrination are to be emphasized. The aims of MHS were stated to be to develop "mass

defense sports activity"; to provide premilitary and postmilitary training; and to educate the population in "self-defense, air defense, and atomic defense." 78/

III. Plans and Training.

A large part of the civil defense activity in Hungary has been obscured by security precautions. Information available to the general public has been controlled and probably has been limited to elementary self-defense training and instructions on behavior during air alerts. Several examples of security precautions may be cited. Plans for the construction of air-raid shelters are classified and must be signed for and returned at the end of each working day. Attempts are made to conceal the construction of shelters, and after completion the shelters are sometimes closed and locked. 79/ Another example of security is the safeguarding of operational instructions in city civil defense headquarters. [redacted] 50X1

[redacted] 50X1

A. National Planning.

Because of the stress on security in Hungary, little information is available on actual civil defense planning at the higher staff levels. Planning has certainly been greatly influenced by Soviet advisers, and the planning assumptions of the Hungarian government have been based on foreign literature and on information furnished by the USSR.

There is little doubt that planning assumptions envisage rather large-scale attack. [redacted] 50X1

[redacted] within a limited governmental circle it is expected that an initial attack would result in deaths amounting to 20 percent of the population and in incapacitated casualties amounting to another 20 percent, but that less than 10 percent of the industrial labor force would become casualties. [redacted] 50X1

[redacted] The 10-percent casualty figure probably refers to the labor force in important war-potential industries which were furnished with heavy air-raid shelters. 50X1

A recently translated article from a Hungarian military engineering journal of 1957 gives some factors to be considered in planning nuclear civil defense. 84/ As the first such article known to have appeared in an unclassified Soviet Bloc publication, it may represent either an isolated breach of security or a step toward declassifying information on civil defense planning. The reason for including the item in an engineering journal is obvious from the text, which states, "The engineering units of the armed forces must be called in to help" the civil rescue service in coping with the damage expected from modern weapons. The bibliography of the article cites sources of 1955 and 1956, and it is possible that the considerations which it mentions were used even earlier in civil defense planning. According to this article, the factors governing civil defense planning include the effectiveness of the weapons of attack; the importance, characteristics, and vulnerability of the target area; and "what the country can afford."

With regard to effectiveness of the weapons of attack, the Hungarian article states that the maximum pressure factors for damage from nuclear blast are 14.22 psi (pounds per square inch) causing complete destruction of most buildings, 5.7 psi causing serious damage, 1.8 psi causing medium damage, 1.1 psi causing light damage, and 0.4 psi breaking windows only. Noteworthy in the article is a statement that a 20-megaton bomb would exert "critical super pressure" at 6.2 miles. The reader can hardly fail to note that this pressure (14.22 psi) will cause total destruction of most buildings to a radius of 6 miles. Similarly, it is stated that 0.4 psi (equated above to window breakage) will occur at distances up to 62 miles. The only comparable unclassified statement noted is from a Soviet military publication which stated that at a US test (March 1954) the "heavy devastation" radius reached 4.35 miles (7 kilometers). 85/ In the past, civil defense literature in the Soviet Bloc has carefully avoided mentioning the radii of blast damage which would result from the larger nuclear weapons. The article does not give any information on the persistency of fallout and the possible extent of the area of contamination.

With regard to the target area, the Hungarian article gives a series of conclusions concerning city planning. These include recommendations limiting the size of cities and their population density, dispersing important new industries and residential areas, and planning for transportation networks always to remain clear. It is also stated that "cities threatened by atomic attack" should plan on new residential areas placed at least 6.2 miles away. The author notes happily that the civil defense principles for city planning are identical with those for socialist town construction.

Several other points are made in the Hungarian article, including statements that helicopters are the best means for observation and reconnaissance after attack, that outlying hospitals should be

provided, and that observation posts must be placed in more secure areas (presumably outside urban centers). The posts should be equipped to determine the epicenter of an atomic explosion. The construction of air-raid shelters using prefabricated elements is stated to be not "advantageous." Only a monolithic reinforced-concrete structure is considered to be a suitable shelter.

B. Training.

Civil defense training has been the subject of frequent reports from Hungary since 1951. Two basic civil defense orders were issued by the government in that year, 86/ and training was reported in industrial plants, places of business, apartment houses, 87/ and schools. 88/ First aid courses for Hungarian women were also carried on during 1951. 89/

1. Civil Defense Leaders.

During the past 6 years a variety of courses and schools in Hungary have been giving civil defense training to selected individuals who, after graduation, are utilized as instructors or civil defense leaders.

A Hungarian advanced technical course in air defense was reported in operation early in 1955. Students were selected government employees, probably from construction enterprises, who had discharged their military obligation. During a 6- to 8-week course, students were instructed about defense principles to be considered in construction of buildings, in town planning, in camouflage, and in construction of air-raid shelters. In addition to technical instruction, students were taught administrative procedures for filling out the permits and documents necessary to obtain approval from the military air defense command for new buildings or improvements of old ones. 90/

Another Hungarian civil defense school was located at Alsogod (47°41' N - 19°08' E) near Budapest (see Figure 2*). Initiated in 1953 by the Ministry of the Interior, this school gave full-time courses of 3 weeks' duration to prospective civil defense instructors and section leaders of the voluntary civil defense groups. It is said that trainees were recruited in large part from MOHSZ, the paramilitary organization. Subjects studied at the Alsogod school included air defense measures, first aid, aircraft recognition, effects of atomic weapons, and atomic countermeasures. 91/ It seems probable that most of the graduates of the Alsogod school were assigned as leaders of self-defense groups in factories and dwelling units. A graduating class

* Following p. 16.

of 150 [redacted] if this rate was continuous, nearly 4,000 civil defense leaders could have been trained in this school before the 1956 uprising. 50X1

2. Civil Defense Battalions.

The training of militarized civil defense battalions in Hungary started by 1954. Members were drafted for training. 93/ The training cycle consisted of a 3-month summer camp plus assemblies during the remainder of the year at the draftee's place of residence.

The summer training camp was located at Szentendre (Izbeg) (47°40' N - 19°05' E). 94/ Instruction remembered by refugees trained under this program included atomic and chemical defense involving reconnaissance, monitoring, and decontamination and employing protective clothing, instruments, and decontamination apparatus mounted on vehicles. The various companies were trained in their specialties -- the signal company in radio and telephone, the engineer company in damage and route clearance, the medical company in first aid (members were litter bearers and ambulance drivers), and the bomb-disposal company in deactivation or destruction of unexploded bombs. 95/ It is probable that the CBR company of the battalion took more advanced training in defense against chemical, bacteriological, and radioactive weapons. The headquarters and staff (tors) company included transportation personnel, cooks, and supply personnel, but no report as to their training has been received. The training of the political company is similarly undefined. (Communist Party and political units of Soviet civil defense during World War II were charged with organizing political talks and education of civil defense workers, raising the level of spirit and discipline, and providing newspapers and the like during periods when civil defense units were required to live in barracks. 96/)

Members of Hungarian civil defense battalions received military pay and allowances during summer training. Time lost from work during the balance of the year probably was paid for by the place of regular employment. Evidently, some of the better trainees were used as cadre members or instructors, returning to camp a second year. 97/

A full-time military civil defense battalion with a 2-year training cycle for 400 to 500 men [redacted] 50X1

3. Industrial Enterprises.

Before the 1956 uprising, each industrial enterprise or plant of consequence in Hungary was required to have an air-raid

50X1

Figure 2. HUNGARY: Civil Defense Students Shoring a House Wall

27097 12-58

50X1

defense organization, and employees were required to take training. The factory manager's deputy in charge of civil defense was sent to attend a special training course. 99/ The deputy then supervised training within the enterprise, which was monitored in addition by civil defense officials. 100/

There were at least two types of civil defense training carried on in enterprises from 1952 to 1956 -- general training for employees and special training for groups having operational assignments. [redacted] there were three graduated training courses given in a Budapest tool factory. Drills and readiness tests were held regularly, during which air attacks were simulated, order crews patrolled, and first aid and fire-fighting crews took up their positions. 101/ 50X1

[redacted] civil defense training in Hungarian industry from 1951 to 1956. Training was compulsory, particularly in major plants, with fines levied in the later years for nonattendance. 102/ Women were recruited extensively for first aid training. 103/ [redacted] operative groups in training in 1954 included those for giving the alarm, for blackout, for maintaining order, for medical duties, for clearance of debris, and for antigas measures. 104/ All personnel probably were to be trained in elementary first aid, fire fighting, and use of the gas mask. 105/ 50X1 50X1

Some atomic defense instruction was introduced in mid-1956, but it is not believed that such instruction before the October-November 1956 uprising had proceeded further than issuing elementary pamphlets and giving occasional lectures on the subject. 106/

4. City Services.

Training of city civil defense units has not been extensively reported from anywhere in the Soviet Bloc. Such services normally would include police, fire, utility repair, and medical personnel reinforced with civilian auxiliaries unified under citywide command. The Hungarian training of civil defense leaders, operational factory groups, civil defense battalions, and the general public in urban areas seems to indicate a fairly advanced state of preparation. It is believed, therefore, that some training of city services may have been accomplished under effective security cover.

[redacted] 50X1

[redacted] Citywide drills have not been observed, however, and it must be concluded that coordinated training of city services is not well advanced in Hungary. 50X1

5. General Public.

Although it is certain that some civil defense instruction has been conducted widely in schools, offices, and various places of work in Hungary, the extent of training for the general public not reached through these programs is not clear. Some refugees have stated that they were wholly unfamiliar with the civil defense training program and others that they had only hearsay knowledge. It must be concluded, therefore, that the basic self-defense training program was incomplete in 1956.

Compulsory courses in air defense, first aid, and fire fighting were, however, carried on in Budapest and other major cities. Women in particular were called on to undergo first aid training. The character of the instruction seems to have been quite elementary.

C. Instructions for Alerts.

Two stages of readiness in air defense are described in a Hungarian civil defense manual, as follows:

1. Civil Defense Alert.

This state of readiness corresponds closely with the Soviet "threatening situation," which signifies that enemy air attack may possibly occur. At this stage, civil defense units are activated, and they draw supplies and set up duty routines. Headquarters shelters are activated, and all equipment is checked. 108/ Orders for this stage of alert are believed to be passed by messenger, telephone, or other secure means. Shelters for the population must be readied for use and directional shelter signs posted. 109/

2. Air-Raid Alarm.

This alarm signifies the approach of enemy planes and is signaled by sirens with a fluctuating sound lasting one-half minute, repeated three times at half-minute intervals. (Bells, whistles, or other locally available means may be used.)

According to instructions, civil defense forces report for duty, equipment is readied for action, and the general public not having civil defense assignments must seek refuge in the assigned air-raid shelter. 110/

3. Chemical Alarm.

Gas alarm is signaled in the conventional manner by a gong or other metal-on-metal signal. 111/

IV. Air-Raid Shelter Program.

Hungary has been helped in establishing an air-raid shelter program by experience gained during World War II and by the presence of protective structures remaining from that period. Old shelters have been enlarged, strengthened, and refurbished in recent years. New shelters have also been built, but the adaptation of older shelters may have resulted in savings of money and materials as well as in more shelters being made available for the amount expended.

In the development of shelters the Hungarians have also utilized brewers' cellars and underground strongholds which in some instances date back to medieval times.

A. Directives.

The basic directive for the construction of air-raid shelters in Hungary is believed to be Decree No. 01/67-1951 VI of the Minister of the Interior, which was promulgated in 1951. 112/ The fullest available text of this decree is given in Appendix A. [redacted] 50X1
[redacted] this directive also outlined a category system 50X1
for the protection of institutions, industries, and the like, as follows:

Category A-1: Munitions factories, radio and electronics factories, steel mills, and food processing and preservation plants.

Category I: Large coal and uranium mines, natural gas wells and storage, petroleum wells and refineries, chemical plants, and cement plants.

Category II: All light industries, bauxite mines, textile mills, clothing factories, agricultural machinery factories, and quarries.

Category III: Industrial offices, small factories, collective farms, and other civilian institutions which do not play an important role in wartime. 50X1

B. BGS* Shelters.

[redacted] 50X1
[redacted] shelters or bunkers** 50X1
able to withstand atomic attack (usually called BGS shelters, but known

* Bomba, gas es szilankbiztos ovohely -- bomb-, gas-, and splinter-proof shelter.
** The term bunker in this report refers to a free-standing shelter, either above or below ground.

[redacted] as "ABC" shelters), were ordered to be constructed at Hungarian installations in the A-1 and I categories in 1951. It was also required that each county seat (megye sekely) and each administrative district in Budapest build at least one ABC bunker for air defense. (There are 19 counties in Hungary and 22 districts in Budapest.) It is believed that some important communications installations were also ordered to build heavy shelters under the A-1 or I category. Construction (in some cases, reconstruction of World War II bunkers) commenced in 1951 and was still going on at the time of the Hungarian uprising in 1956. 50X1

The building of shelters was tied in specifically with new construction. New factories could not be built or additions made to existing factories unless the required shelters were first provided.

[redacted] BGS shelter specifications substantially as follows 114/ (see Figure 3*): 50X1

1. Minimum thickness of roof, walls, and base floor must be 2.6 meters (m) of concrete. It is required that the outside layer of concrete, to a depth of 1 m, should be free of reinforcing rods. The remaining 1.6 m should be reinforced with steel rods, ranging in spacing from 25 centimeters (cm) on the outside to a screen mesh on the inside. The steel reinforcing rods vary in diameter from 1.5 cm on the outside to 5.0-millimeter (mm) wire on the inside.

2. Minimum strength of compression of the concrete must be 540 to 600 kilograms (kg) per square centimeter.

3. Minimum airspace per person must be 0.9 to 1.0 cubic meter (cu m).**

4. Minimum floorspace per person must be 0.40 to 1.35 square meters (sq m).

5. Each BGS shelter must develop an independent water supply and insure a minimum storage capacity of 1 liter per person per day for the maximum shelter capacity plus triple the same amount for sewage disposal, decontamination, and the like.

6. Each shelter must be provided with an auxiliary power unit capable of producing enough electricity to provide for the total needs of the shelter, including radio, light, ventilation, and X-ray and other electrical equipment installed in the shelter.

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* Following p. 20.

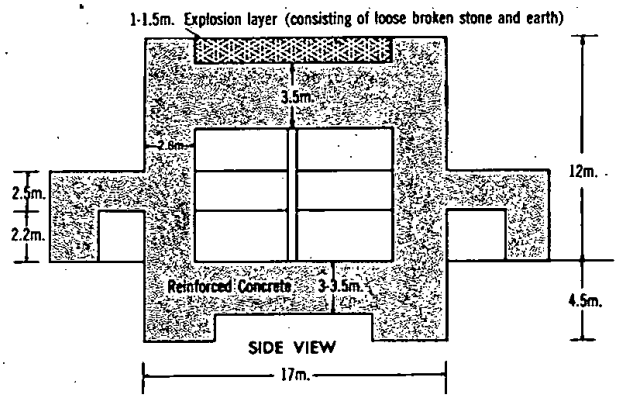
** This figure is possibly an error [redacted] 50X1

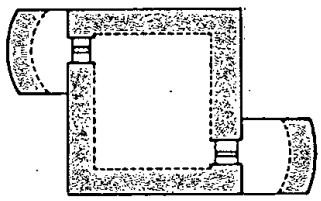
[redacted] 50X1

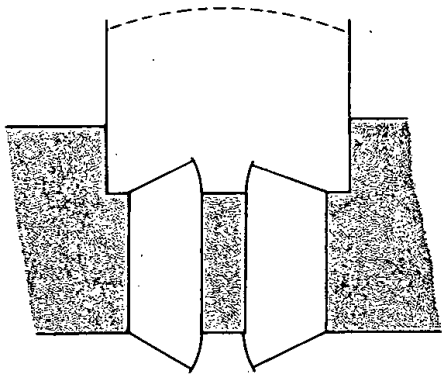
[redacted] 50X1

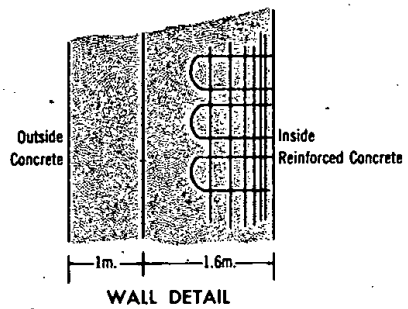
Figure 3

HUNGARY: BASIC CONSTRUCTION REQUIREMENTS FOR AN AIR-RAID BUNKER









27098 12-58

[redacted] 50X1

7. Sewage disposal must be positive, with sewage being conducted to the outside of the shelter.

8. Medical facilities, including a complete store of narcotics, bone-setting materials, minor surgical supplies, and X-ray, must be provided.

9. All shelters must be equipped with bombproof double steel doors.

10. All shelters must be provided with both short-wave transceivers and VHF (very high frequency) equipment.

11. The shelter must be linked with the district or county civil defense headquarters to which it is subordinated as well as with all other BGS shelters within the same district. Telephone cables must be installed underground.

12. The amount of preserved food required for the maximum capacity of the shelter for a minimum of 2 days must be stored in the shelter.

13. Equipment and furnishings must be installed in the shelter in such a manner as not to come in contact with any wall. Benches for occupants of the shelter must be placed so that such occupants can at no time lean against a wall.

14. A sufficient number of filter ventilating units must be installed to provide air for each 50 occupants of the shelter. The ventilating fans must be designed to be operated mechanically (by electricity) or by hand.

15. The maximum capacity for any single room is 50 persons. Under no circumstances will furnishings be provided for more than this number. Thus no room can be larger than 20 sq m.

16. All operating units of the BGS shelter must be located on the bottom floor of the shelter (see Figure 4*). These units include the following:

a. Control center.
b. Medical center and first aid supplies.
c. Police center.
d. Fire department.
e. Room for decontamination equipment and personnel.
f. First aid room.

* Following p. 22.

g. Radio room.
h. Telephone exchange and message center.
i. Evaluation and screening room.
j. Decontamination shower.

17. Toilet facilities with running water must be provided.

18. Each BGS shelter must be constructed in such a manner as to permit the entire unit to be hermetically sealed off from the outside air.

[redacted] 50X1
[redacted] training courses for civil defense specialists 50X1
in Hungary, which describes and gives a sketch of a nearly identical structure called a bunker for protection against bombs, gas, and splinters (BGS). Only very minor variations occur in dimensions between the BGS and the so-called ABC bunker mentioned above. The roof pad of the described BGS shelter consists of stone blocks between two 50X1
layers of sand instead of broken stone and earth.

[redacted]
[redacted] these shelters as being almost identical with the specifications 50X1
furnished by the air defense adviser and with those included in the course for civil defense specialists. Minor differences include the reported use of basalt blocks for the roof pad and the absence of food supplies, although provision was made for stored water and portable latrines in 1952 and 1953.

[redacted] 50X1
[redacted] a 500-person bunker with 3-m 50X1
walls and a 5-m roof of reinforced concrete. This type of bunker is built aboveground and reportedly has a well to supply water. 117/

There appears to be some flexibility in the construction of BGS bunkers. They may be built aboveground, partly underground, or completely underground. 118/ The aboveground type is reported to be less costly but to require a firm rock foundation.

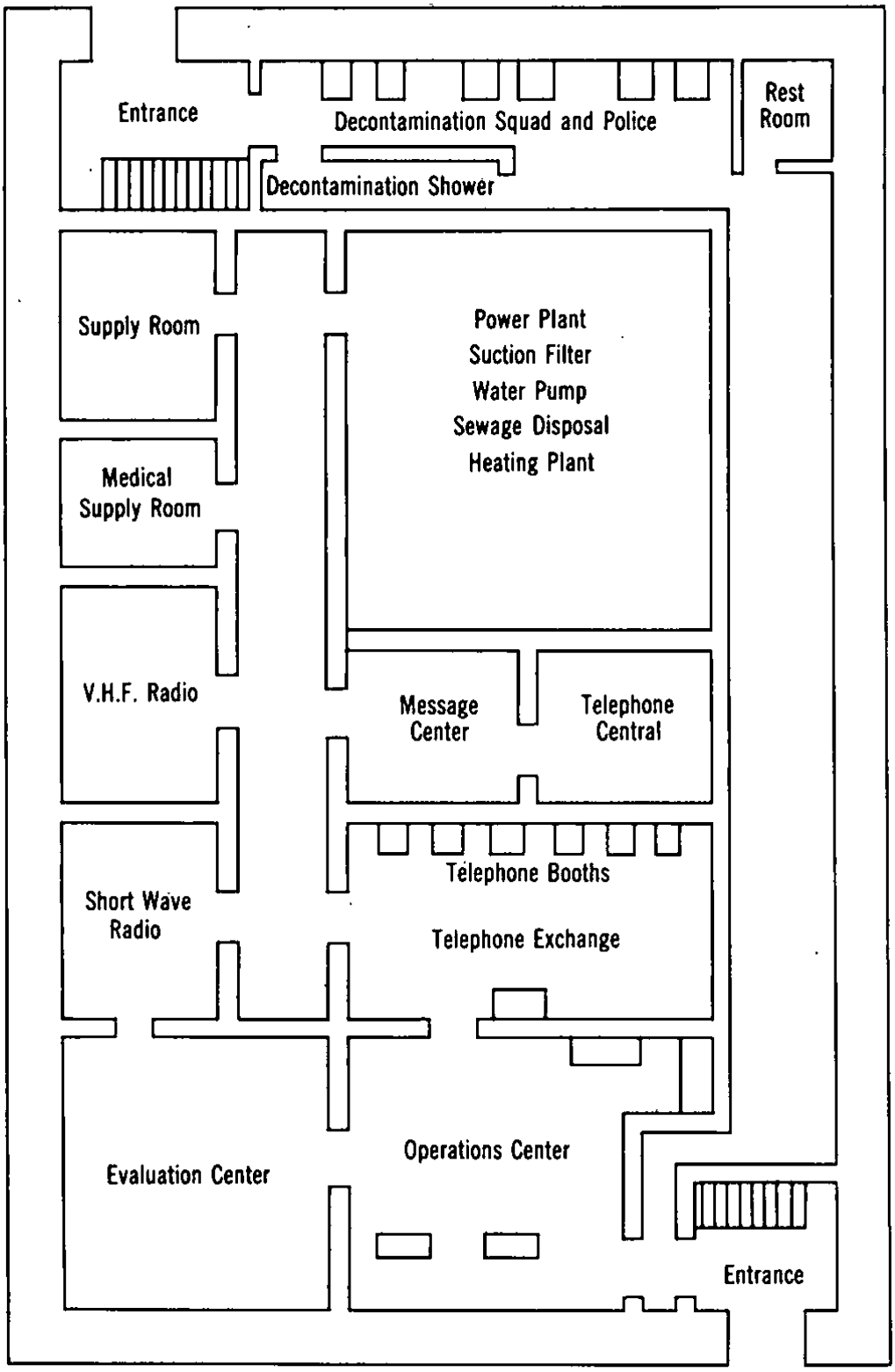
According to information imparted at the civil defense specialists' course, the BGS category of shelters also includes a variety of types of underground shelters, including those constructed where mines or rocky slopes are "favorable" for tunnel and gallery construction. 119/ Typical of these are the reported shelters at

[redacted]

Figure 4

50X1

HUNGARY: FLOOR PLAN OF THE FIRST FLOOR OF A TYPICAL AIR-RAID BUNKER



27099 12-58

[redacted]

50X1

locations of various munitions plants. Starting with two drifts or tunnels into a hillside, galleries are "laddered" between the tunnels to give the capacity desired (see Figure 5*). [redacted] 50X1
[redacted] a minimum earth cover of 164 feet is required for a shelter of this 50X1
type. 120/ (Similar shelters have been reported at Soviet installations. 121/) Shelters such as these at industrial enterprises are sometimes reported to be multiple-purpose -- for air-raid shelter, for storage, and for alternate emergency operations in time of war.

C. Basement Shelters.

[redacted] 50X1
[redacted] enterprise built air-raid shelters 50X1
"in the basements of new state-controlled buildings that were two stories high or higher, such as apartment houses, hospitals, and buildings occupied by government agencies." 122/ [redacted] 50X1
[redacted] plans for the construction of apartment houses were based on 50X1
Soviet regulations, that Soviet construction experts at the Ministry of the Interior supervised "over-all construction," and that it was required that apartment houses have bomb shelters in basements. 123/

1. Apartment Dwellings.

[redacted] locating or describing basement air-raid shelters in apartment houses in Hungary, but it cannot be demonstrated that the practice was universal. A refugee who was a construction company engineer, however, refers to an ordinance in effect since at least 1949 which requires the construction of new dwellings to include basement shelters. 124/ [redacted] 50X1
[redacted] dates the start of such construction as early as 50X1
1945. 125/ [redacted] 50X1
the start of the construction of basement shelters in 1951 [redacted] 50X1
[redacted] 4,000 to 5,000 of these shelters were built annually during 50X1
1952-56. 126/ A production order for 50,000 steel air-raid shelter doors, 5 to 6 cm thick, reportedly was placed early in 1952. 127/ At 4 doors per shelter (2 entrances with double doors), this order would be sufficient for 12,500 shelters of the basement type.

In addition to a program of construction of new basement shelters, there is a program of renovation of old basement shelters -- those remaining from World War II were surveyed, cleaned, 128/ and repaired 129/ during the period 1951-56. Some basements in older buildings were adapted for use as air-raid shelters 130/ -- American Legation personnel witnessed construction activity and a steel door being passed into a Budapest basement on 1 March 1956. 131/

* Following p. 24.

Details of construction of basement shelters in new dwelling units have been reported as follows 132/ (see Figure 6*):

a. Size: capacity of 150 to 300 persons.

b. Space: with forced ventilation, 0.6 sq m and 2.5 cu m per person; without forced ventilation, 0.75 sq m and 2.5 cu m per person.

c. Components required: airtight gaslock, anteroom, interior rooms, and lavatories.

d. An escape tunnel whose length is more than one-half the height of the building.

e. Ceilings: shelters in 2-story buildings have ceilings 7.9 inches (in) (20 cm) thick, with a strength of 2.84 psi (2,000 kg per sq m).

Shelters in 3- and 4-story buildings have ceiling thicknesses 5.9 in (15 cm) thick, with a strength of 1.42 psi (1,000 kg per sq m).

Reinforcing consists of 0.3-in (8-mm) rods placed in a 7.9-in (20-cm) mesh pattern.

f. Outer walls: brick, 20 in (51 cm) thick; anchor rods 11.8 in (30 cm) deep into wall, spaced every 39 in (1 m) for anchoring ceiling.

g. Floor: lightly reinforced concrete, 3.9 in (10 cm) thick.

[redacted] the ceiling strength to be 3.4 psi (2,400 kg per sq m rather than 2,000). 133/ (It is believed that, in the case of air-raid shelters under substantial buildings, civil defense officials in the Soviet Bloc rely on the overlying structure to reduce blast pressure by half. This would be true only in the lower pressure ranges, in which the building itself is not severely damaged.) 50X1

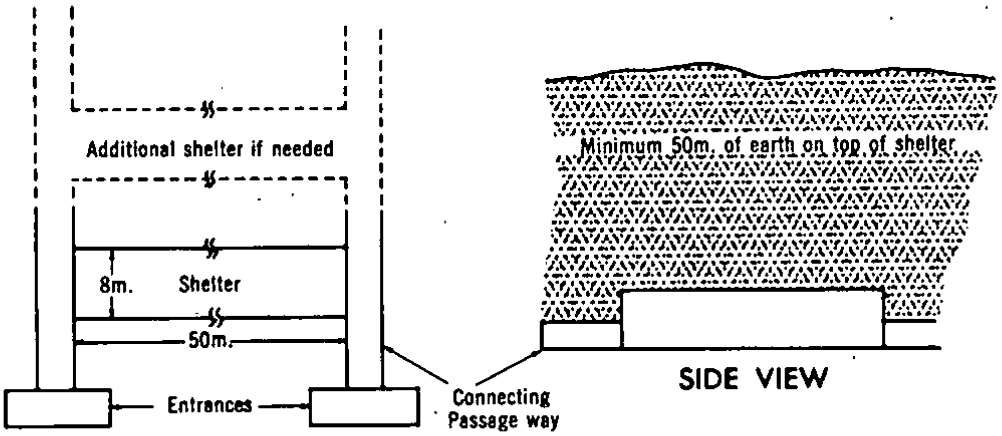
"Vital points" may be given heavier basement shelters. Such structures are described as having walls of brick 25.2 in (64 cm) thick or of poured concrete and ceilings of reinforced concrete 19.7 in (50 cm) thick. It is indicated that this roof would sustain a stress of 12.8 psi (9 metric tons per sq m). 134/ Such strengthened basement shelters might be provided for low-level civil defense headquarters, for first aid installations, and for apartments housing medium-level officials.

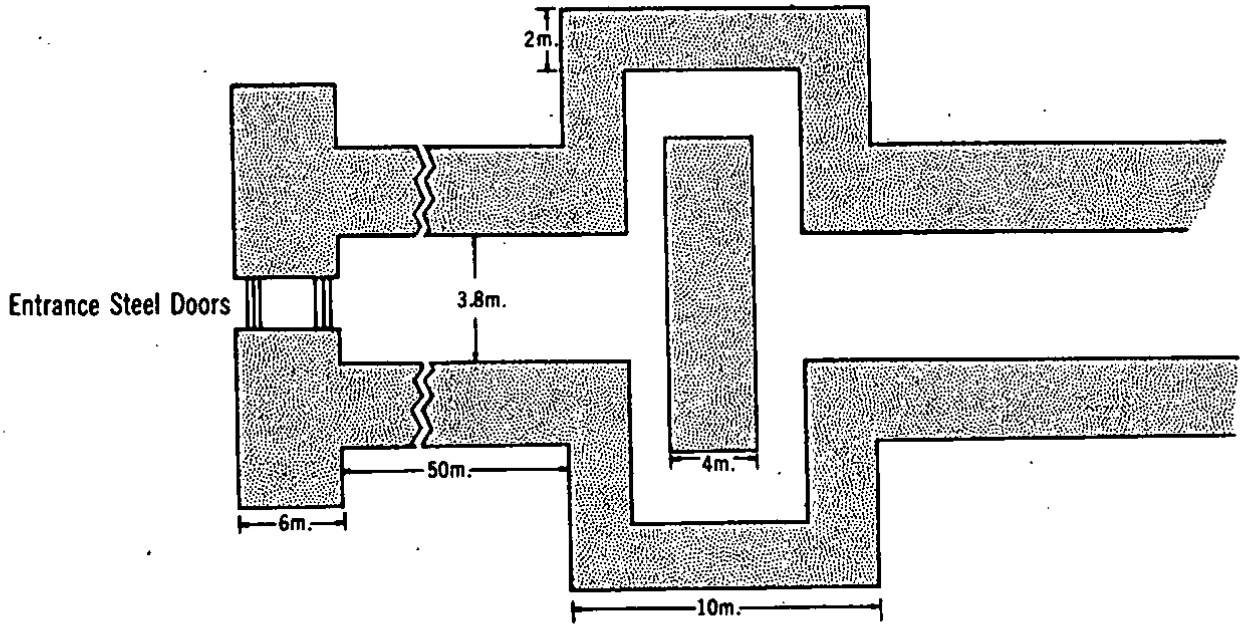
* Following p. 24.

Figure 5

50X1

HUNGARY: TYPICAL AIR-RAID SHELTER IN A MUNITIONS PLANT





TYPICAL ENTRANCE ARRANGEMENT

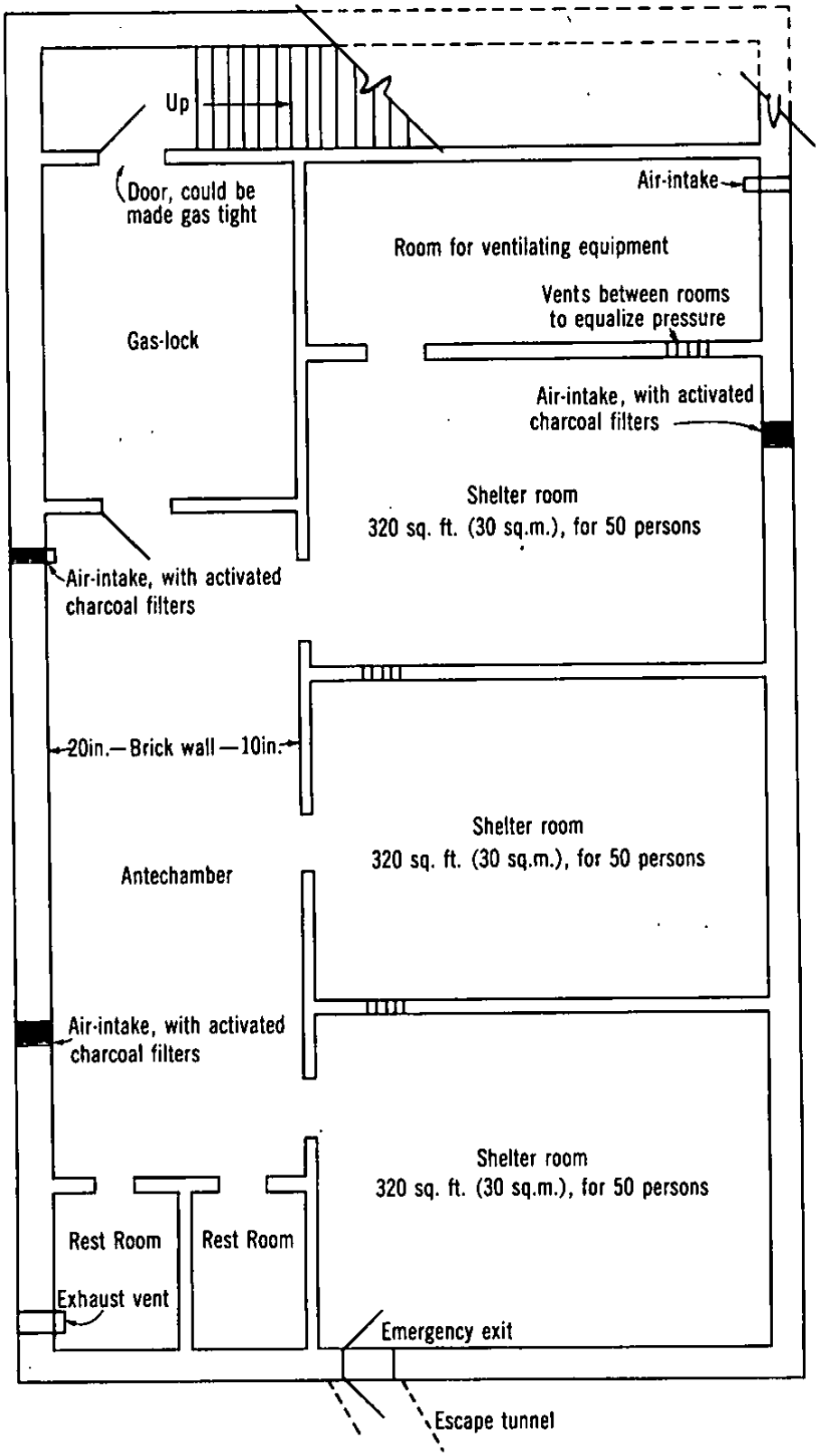
50X1

27100 12-58

Figure 6

50X1

HUNGARY: FLOOR PLAN OF A BASEMENT AIR-RAID SHELTER



27101 12-58

50X1

2. Industrial Shelters.

Some basement shelters in industrial buildings have existed in Hungary since World War II. 135/ By 1952, however, a new order was in effect requiring the construction of new basement shelters in industry. 136/ For example, in Budapest existing shelters were cleaned, and factories employing more than 500 people were ordered to construct basement shelters. 137/ This order probably was part of the directives issued in 1951.*

Most probably, basement shelter is furnished those economic enterprises which do not qualify for heavy (BGS) bunkers under categories A-1 or I -- that is, enterprises in category II.

3. Government Shelters.

Construction of basement shelters in public buildings in Hungary was also ordered in 1951. Some basement shelters remain from World War II, 138/ and others have been built since. 139/ Their strength may vary from a level comparable with that of the BGS bunkers to that of the apartment shelter basements already described.

4. Medical Shelters.

[redacted] 50X1

[redacted] The degree of protection is specified as "debris-, gas-, and splinterproof" (tormelek, gaz es szilankbiztos -- TGS), and the shelter is described [redacted] as having 23.6-in (60-cm) stone walls and a 5.9-in (15-cm) reinforced concrete ceiling. 141/ Minimum requirements for a first aid station are listed as (a) a gas trap covering 43 square feet (4 sq m); (b) a distributing room covering 215 to 269 square feet (20 to 25 sq m); (c) a bandaging room of the same area; and (d) a "TC" (probably portable latrine). Emergency exits, heat, and light must also be furnished. 142/ Instructions in 1953 specified that if it was impossible to set up this type of shelter "at once," another type (presumably weaker) would be satisfactory. More elaborate specifications for first aid stations call for dressing rooms, showers, electrical generators, an operating room, and a room for the use of medical personnel. 143/ 50X1 50X1

* See Appendixes A and B.

Hospitals are said to fall under the blanket order of 1951 for construction of basement shelters in newly constructed state-owned buildings. 144/

D. Special Plant Galleries.

Several industrial enterprises in Hungary, principally munitions plants, have underground galleries 145/ (see Figure 7*) which are newly built 146/ or reconstructed from World War II installations. 147/ The fact that galleries in a number of enterprises were constructed during 1948-53 148/ supports a belief that such construction was carried out under a nationwide program. It is possible that this type of underground gallery has three purposes, as follows: (1) for protected storage, 149/ (2) for alternate production space, 150/ and (3) for the shelter of personnel during air attack. 151/

E. Other Types of Shelters.

Other shelters in Hungary have been reported which are of technical interest, but the program for their construction is unknown.

1. Arched Tunnel Shelters.

Two refugees have identified an underground arched tunnel used for an air-raid shelter, 152/ and one has described and sketched details of its construction which were observed in 1954. Located 16 to 24 feet (ft) (5 to 7 m) underground, the shelter was of cast reinforced concrete parabolic segments (see Figure 8*). The shelter allegedly was for the use of industrial technicians.

2. Prefabricated Controllers' Shelters.

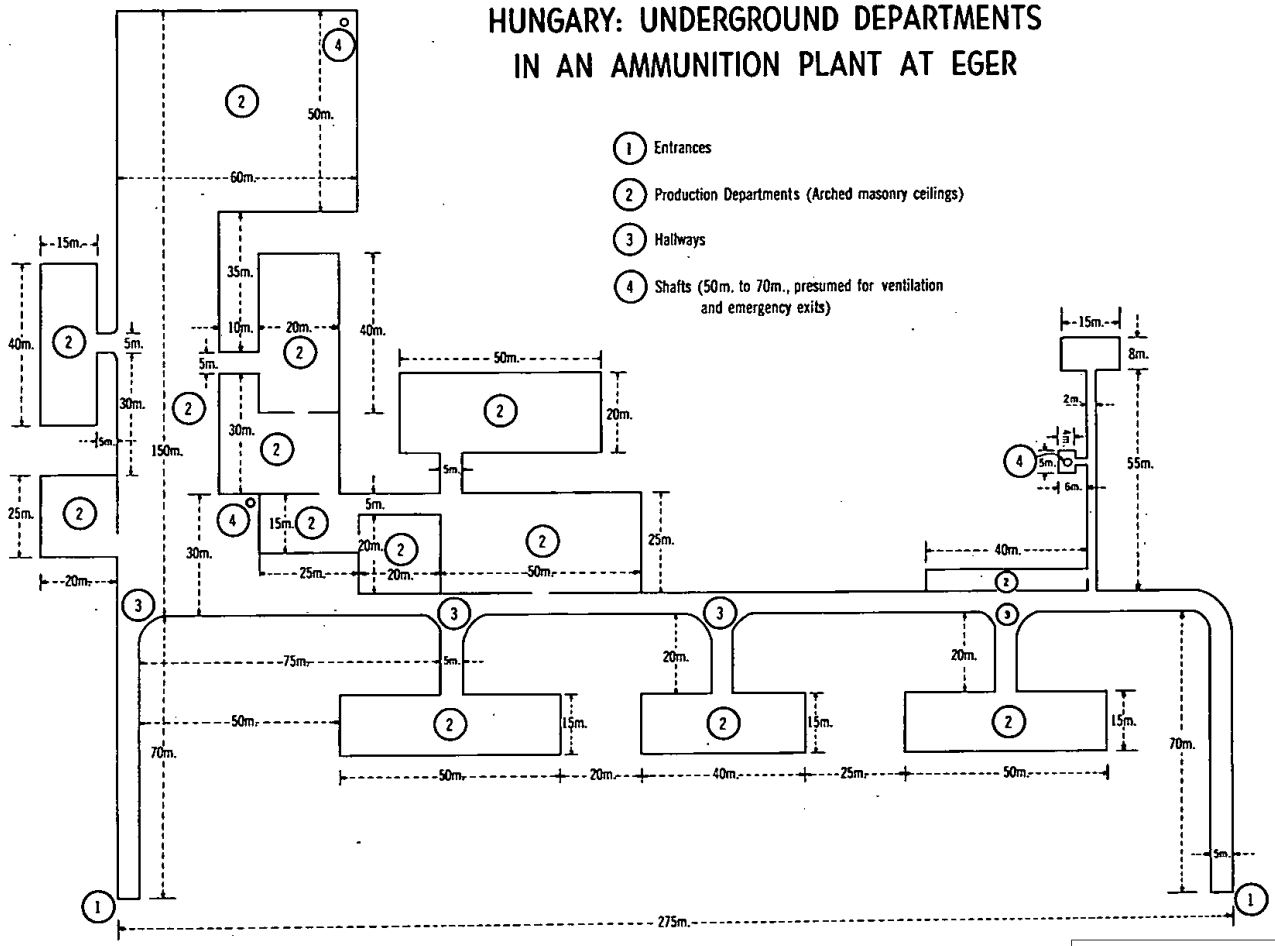
A Hungarian refugee architect states that he designed a mobile air defense shelter for personnel required to remain on duty at control stations during air attacks in such places as powerplants, blast furnaces, and the like. The original plan called for a shelter with vertical sides, but this was discarded in favor of an egg-shaped shelter capable of holding three men. Observation slits and an antenna opening for radio equipment were included in the original design. Blast-pressure resistance was given as 8.5 psi (6,000 kg per sq m). Test results of this shelter were sent to the USSR in 1955. 153/ Although only two such shelters have been reported at Hungarian power station control boards, 154/ the designer stated that approximately 1,000 of them were built during late 1955 and 1956 (see figure 9*).

* Following p. 26.

50X1

Figure 7

HUNGARY: UNDERGROUND DEPARTMENTS IN AN AMMUNITION PLANT AT EGER



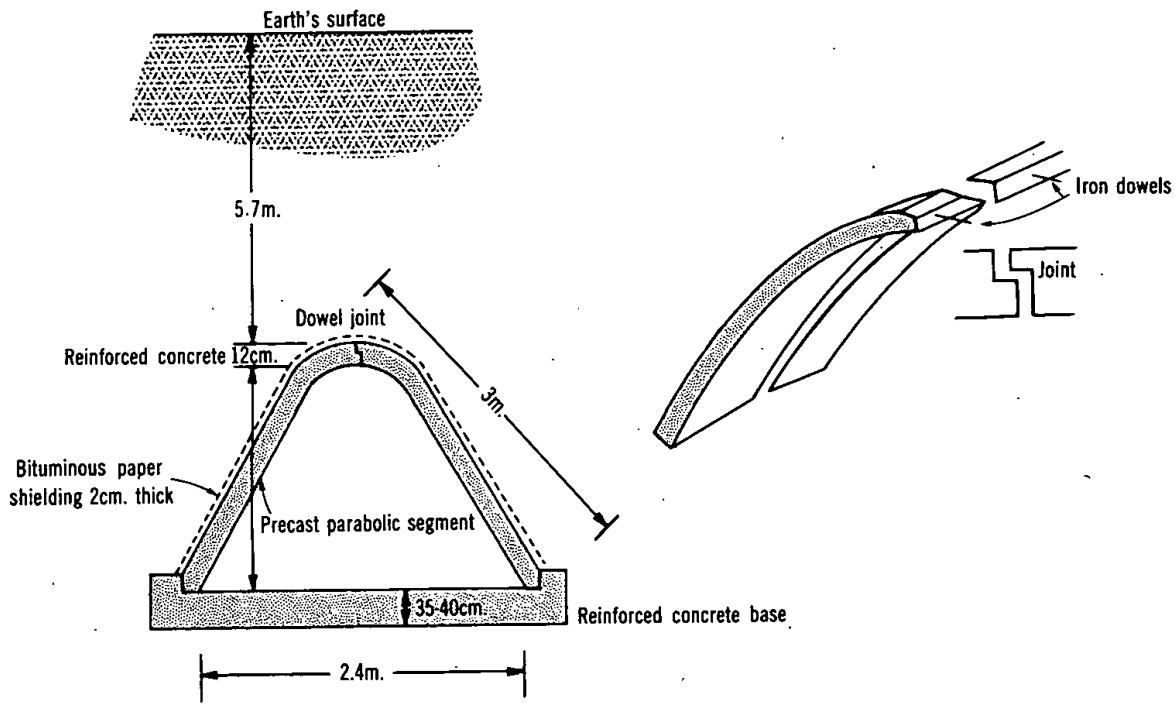
27102 12-58

50X1

Figure 8

50X1

HUNGARY: CONSTRUCTION DETAILS OF AN "ATOMIC" AIR-RAID SHELTER



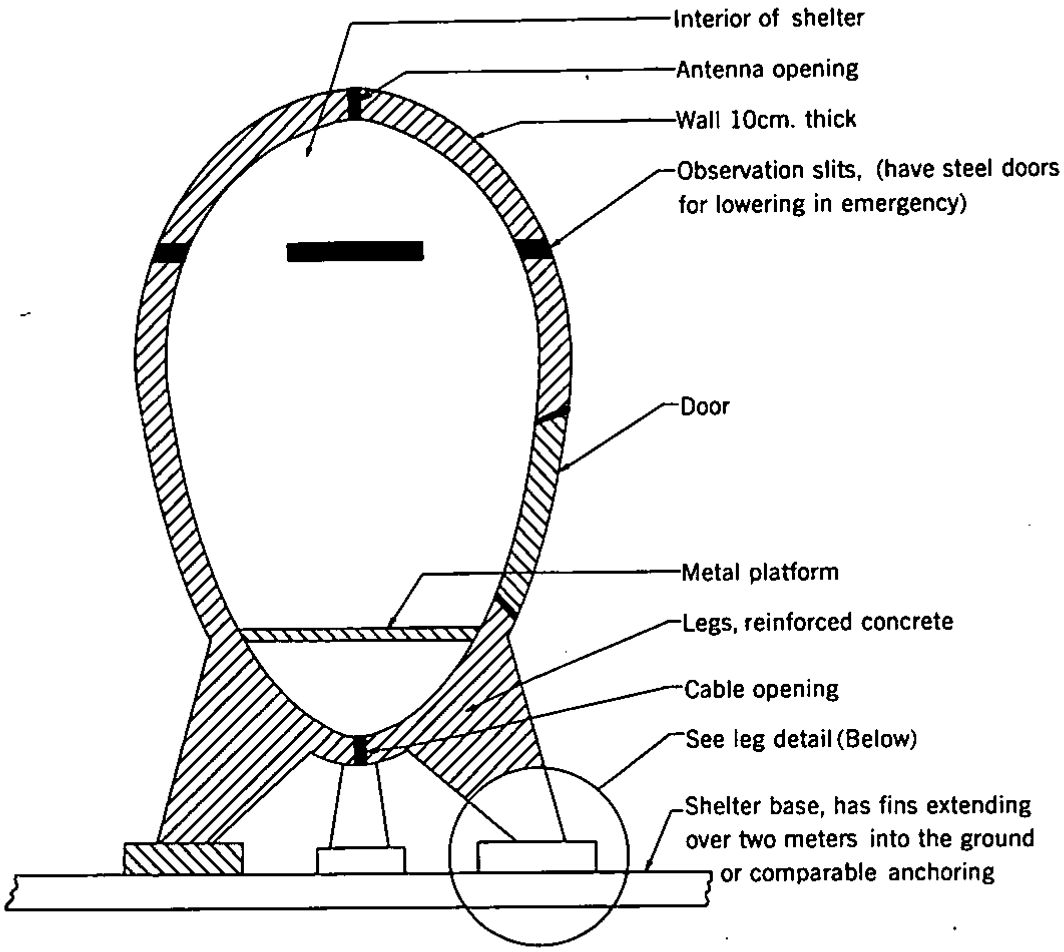
27103 12-58

50X1

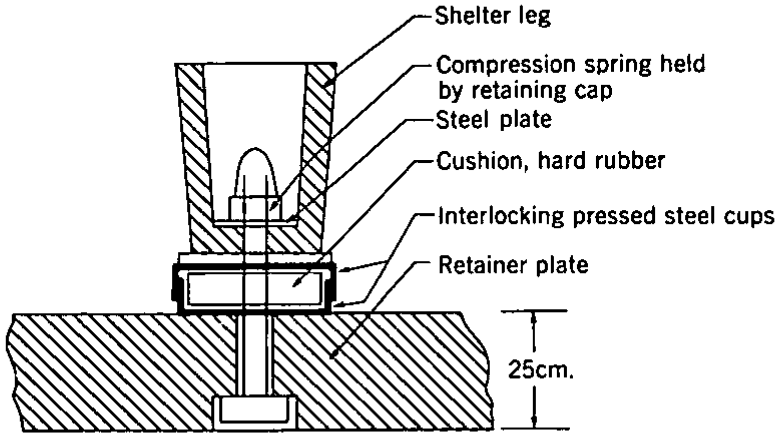
Figure 9

50X1

HUNGARY: A THREE-MAN AIR-RAID SHELTER



SHELTER LEG ANCHOR DETAIL



50X1

27104 12-58

F. Possible Changes in Plans.

There may have been some alteration in the shelter construction program in Hungary during 1956, but evidence of such change is fragmentary and inconclusive. [redacted] the suspension in 1956 of the construction of basement shelters in new apartment houses in Budapest. 155/ [redacted] 50X1 50X1 50X1

V. Budapest Shelters.

Beyond any doubt, numerous air-raid shelters have been prepared in Budapest, the capital city of Hungary. Evidence includes a 1951 manual giving instruction on the building of shelters 156/; the testimony of a refugee architect familiar with plans 157/ and another who supervised construction 158/; reports of particular installations from many refugees; and, in a few cases, corroborating external observation by American Legation personnel. 159/

A. Tunnel and Gallery Shelters.

According to instructions in Hungarian civil defense manuals, the most economical types of "bombproof" shelters are those established in either existing or new caves or galleries. The minimum recommended earth cover in 1951 was 59 ft (15 m) of earth. 160/ This recommendation may have been doubled since that time. 161/

A number of tunnel systems have been established for air defense purposes under various hills in Budapest. These shelters apparently are not to be used for broad segments of the population but for the headwuarters of air defense, civil defense, and ground forces and for essential elements of government. Although not available as refuges for the general public, such shelters would contribute to maintaining continuity of government and control.

The underground active military air defense headquarters under Kis Gellert Hill in Budapest is well known. 162/ In addition to this military air defense headquarters, the hill contains an underground telephone exchange 163/ and the principal emergency civil defense center for Hungary. 164/ The latter consists of emergency operation quarters for both the national and the Budapest civil defense commands. [redacted] the underground system under Kis Gellert Hill is enormous. There are dozens of rooms interconnected by tunnels built on 3 or 4 levels. 165/ The highest level of the system is reported to be under 164 feet (50 m) of sandstone. 166/ 50X1

Another underground installation in Budapest is under the nearby Gellert Hill. This installation is alleged to be an emergency military headquarters and an alternate government center. The hill contains an underground water reservoir. 167/ Hillside entrances have been observed by American Legation personnel. 168/

A third underground complex in Budapest is located under Var Hill (see Figure 10*). 169/ This complex is reported to contain shelter for government and Communist Party offices 170/ as well as an underground hospital. 171/ Two entrances to this hill have been seen by American Legation personnel. 172/

Other underground complexes have been reported prepared in Budapest at such locations as Sas Hill 173/ and Svab Hill 174/ and in the Kobanya District. 175/ It is believed that most, if not all, of these underground systems represent remodeled and enlarged installations remaining from World War II.

B. Subway Shelters.

The new Budapest subway was built with air defense considerations in mind, although it was publicized as having been constructed to satisfy transportation requirements. Engineers associated with the construction, which was started in 1950, state that in addition to its normal function the subway was designed to serve as a mass air-raid shelter and to provide an emergency railroad link under the Danube for use in case the Budapest bridges were destroyed. 176/ Soviet advisers evidently forced a revision of the Hungarian plan to build the subway at a depth of 49 ft (12 m) and required it to be built at a depth of 105 ft (32 m). 177/ 50X1

50X1

The new subway was being built at 12 shaft locations in 1951 (see Figure 11*). In 1953, however, financial and material difficulties led to a gradual suspension of work. 179/ Maintenance work has been carried on since 1954. 50X1

some sections of the unfinished subway were ordered to be converted for use as air-raid shelters. 180/

It is difficult to determine how much of the unfinished subway could serve as shelter at the present time. 50X1

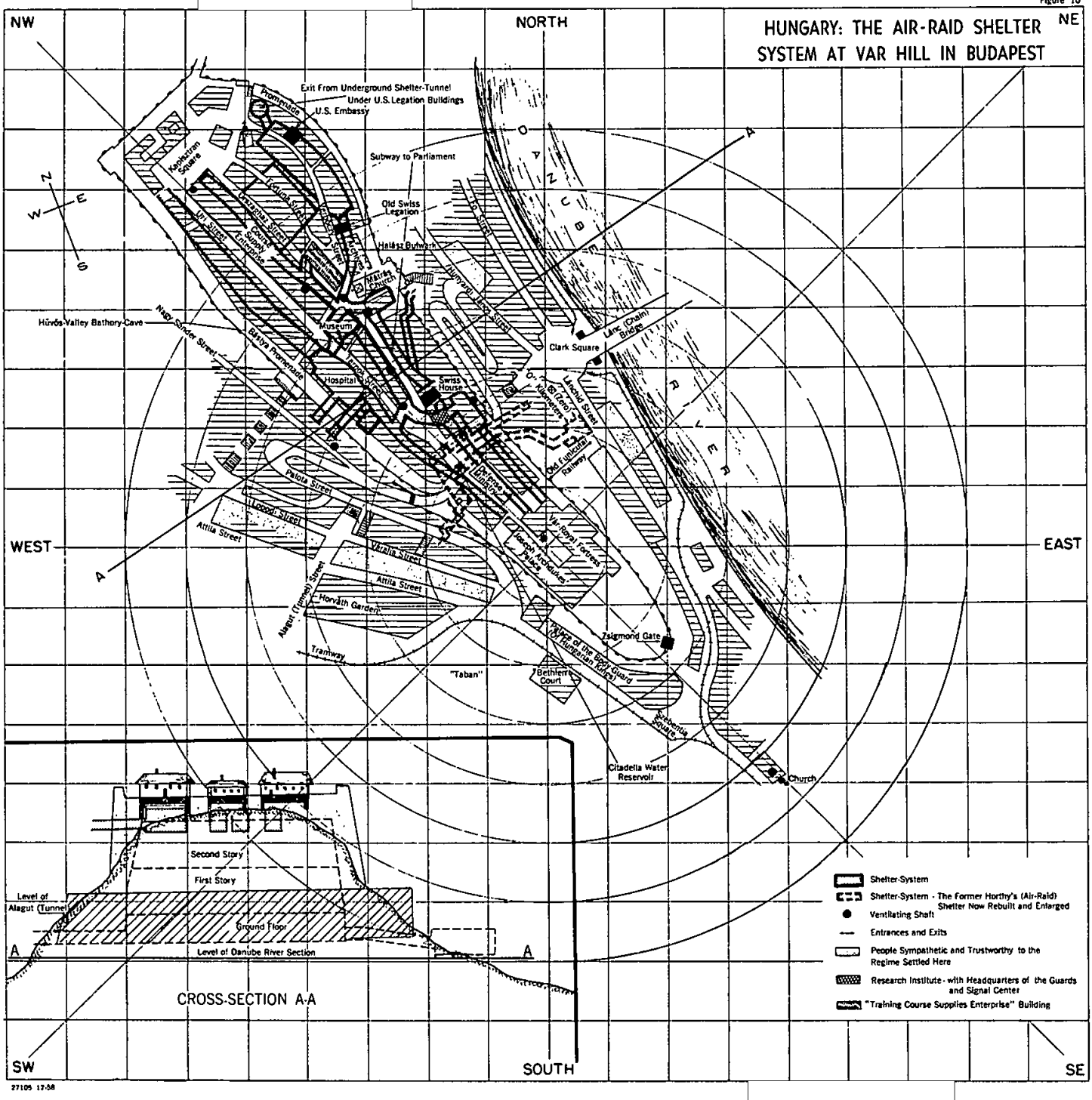
50X1

tunneling was started in one or both directions at most construction 50X1

* Following p. 28.

50X1

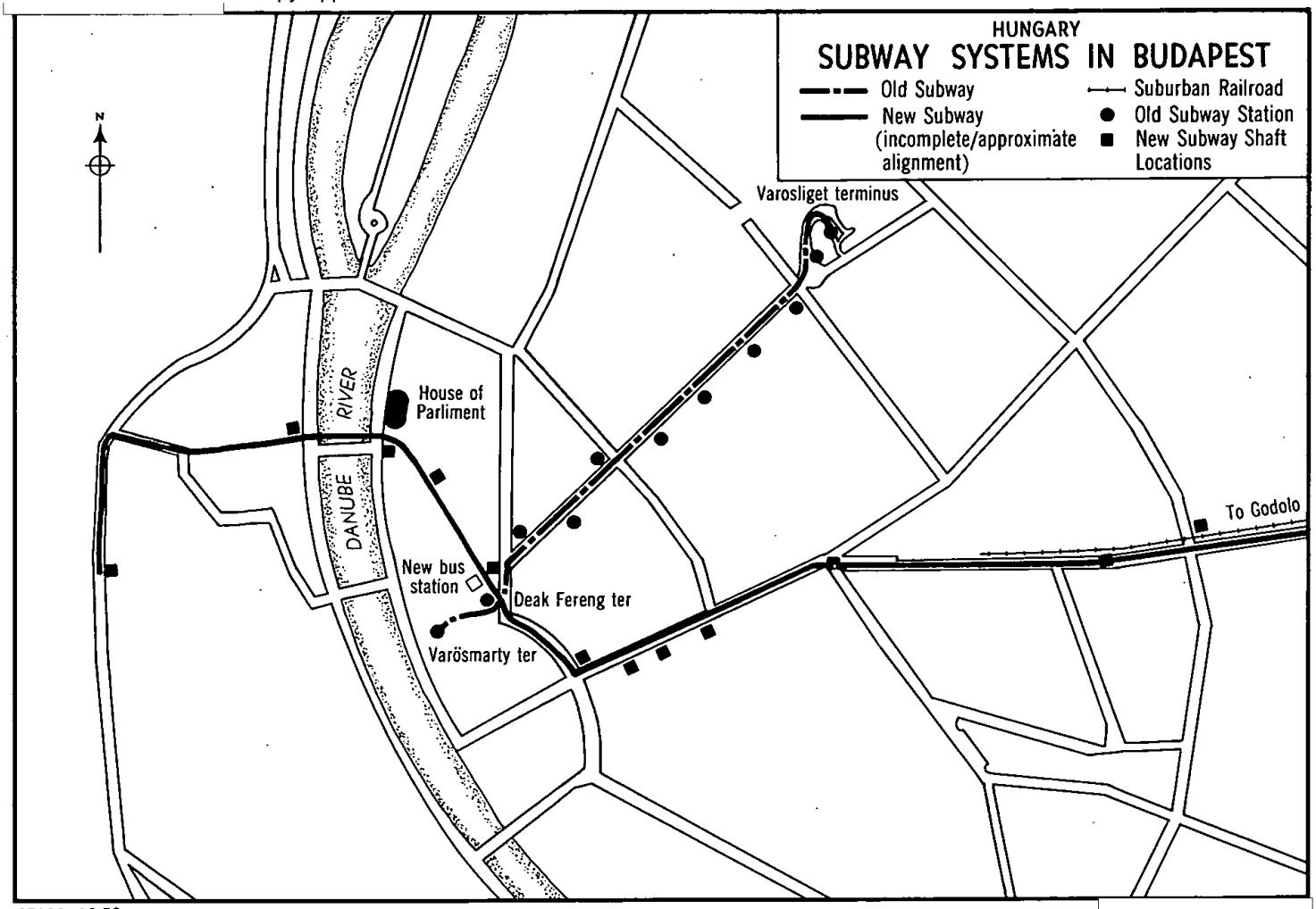
Figure 10



50X1

Figure 11

50X1



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50X1

sites. 181/ Two of five underground stations are reported to be structurally complete or nearly so. 182/

An underground tunnel system, linked to the subway, is [redacted] 50X1
[redacted] to connect Communist Party and government buildings 50X1
in downtown Budapest. 183/

C. Government and Communist Party Shelters.

In addition to emergency government control centers in various hillside galleries, the principal government and Communist Party buildings in Budapest have been provided with either basement or nearby air-raid shelters.

1. Ministry of Defense.

There is a [redacted] basement shelter under the 50X1
Ministry of Defense building in Budapest. 184/ The strength of the
shelter (ceiling specifications and so on) is not known. [redacted] 50X1
[redacted] this basement contains an armory; 2 refrigerator 50X1
chambers; an emergency kitchen; more than 40 offices, including a large one for the chief of staff; and 2 rooms for medical personnel. Offices are furnished with desks, chairs, and beds, and each room in the shelter contains a telephone. An emergency tunnel exit is provided. Medical instruments and small arms are kept in the shelter, and
[redacted] food sufficient for 150 men for a week is 50X1
kept in the refrigerator chambers. 185/ [redacted] 50X1
[redacted] such shelters would be equipped normally with filtered ventilation, an emergency generator, and lavatory facilities. 186/ 50X1

[redacted] an additional underground bunker was constructed in the courtyard of the Ministry of Defense building during 1955 and 1956. This bunker is [redacted] 50X1
[redacted] a concrete box, poured in one operation, with reinforcing rods in the 50X1
floor and ceiling welded to rods in the side walls. Over the ceiling an airspace has been left, above which is a second reinforced concrete slab, 1.8 m thick. This installation has only one floor, with a reported area of about 28 sq m. [redacted] this bunker 50X1
was to be a repository for documents. It was, however, air conditioned and probably was connected with the known basement shelter under the main building. 187/

2. Communist Party Headquarters.

A massive bunker which probably was an air-raid shelter was found at the time of the Hungarian uprising beneath the Communist Party headquarters building in Budapest. 188/ Believed by the insurgents to be an underground jail, the structure was attacked with pneumatic drills,

but it withstood efforts at penetration until the Soviet forces regained control of the area. 189/ Reportedly this underground stronghold reaches 18 to 20 m underground and contains 2 or 3 stories. There are rumors of tunnel connections to the National Theater and to the unfinished Budapest subway.

According to a news story at the time of the uprising, the Communist Party headquarters had been closed for nearly 12 months for "reconstruction." The nature of the work, however, became known generally only when insurgents gained access to the building, illustrating the success of security measures in obscuring special construction.

3. Hungarian News Service Building.

Constructed during 1951-53, the Hungarian News Service building in Budapest is described as having 5 floors aboveground and 4 underground, with the first 2 underground floors containing offices, laboratories, and communications equipment. The third underground floor contains an air-raid shelter and food storage space, and the fourth houses heating and ventilating facilities, including an emergency generator. The shelter allegedly has a capacity for 800 to 1,000 persons. 190/

4. Hungarian State Railroads.

The headquarters of the Hungarian State Railroads in Budapest were provided with a heavy 5- or 6-story bunker of the BGS type in 1953. 191/ This bunker is reported to contain an emergency railroad office and archives and a civil defense headquarters. In addition to heating and ventilating systems, it contains emergency generating equipment and switchboards. The command center is said to be connected with military and government headquarters and with important railroad junctions.

5. Police Buildings.

Several police buildings in Budapest are reported to have underground prisons or air-raid shelters. 192/ In view of the role of the police in civil defense, it is probable that important police headquarters have such dual-purpose installations, which furnish a high degree of protection.

6. Other.

Other government or Communist Party shelters reported in Budapest include installations at the National Archives Center, 193/

the national Communist Party headquarters, 194/ and the Parliament building. 195/ Still other shelters have been reported to be in the vicinity of the villas of high government officials. 196/

D. Transport and Communications.

A 500-person, 3-story bunker at the Ferencvaros railroad station in Budapest is [redacted] as follows 197/: 50X1

> ... This bunker was being built from March to November 1952. I last observed the bunker in March 1954. The bunker consisted of three floors and was constructed of concrete composed of basalt, cement, and gravel. Within the concrete outer walls of the bunker a layer of steel mesh was vertically emplaced at successive depths of 15 cm and 25 cm from the inner sides of the walls ... . The impact pressure of the bunker's top was 450 kg per sq m. Space within the bunker was sufficient to provide an estimated 2 to 2-1/2 sq m per person and 2 cu m of air per person. There were two toilets without running water on each floor of the bunker. Buckets were utilized to provide water. The bunker contained an unknown number of first aid boxes but no food supplies. During an emergency, people were to be directed into the bunker by specially assigned personnel. The bunker's roof in its lowermost section consisted of 2-1/2 m of reinforced concrete. Above the ceilings of the rooms on the third floor were horizontal iron bars, each 19 m long and 24 cm in diameter. Basalt blocks, each measuring 30 cm in height, width, and length were embedded in the roof to a depth of 1 to 1-1/2 m to prevent damage to the bunker ... . The entrances of the bunker had double steel doors. Each door was 10 mm thick, had rubberization around the edges to maintain an airtight closure, and had special opening and closing handles. Other doors within the bunker were of steel and were 5 mm thick. This bunker was to be used by railroad employees from the Ferencvaros railroad station. The bunker was always closed but unguarded. There was an air-conditioning system in the bunker. Perforated steel pipes with filters, each pipe 20 cm in diameter, led from the outside into each room of the bunker. Each pipe was connected with the air-conditioning equipment located on the ground floor. The air-conditioning equipment regulated both the

air conditioning and the air pressure in the room. The air-conditioning equipment was 3 by 5 m and 3-1/2 m high. Two generators were located on the ground floor. The bunker was self-sustaining in power.

A general program for constructing shelters at railroad installations has been reported, 198/ [redacted] 50X1

In addition to the underground communications centers under the Kis Gellert and the Gellert Hills,* two communications bunkers are known to have been built in Budapest. The first of these is the two-story bunker at Radio Budapest built in 1952 and 1953. It is of typical heavy aboveground construction with walls 9.8 ft (3 m) thick and roof 12 ft (3.5 m) thick. Its capacity for shelter purposes is said to be negligible because of the amount of broadcasting and generating equipment installed. 200/ At the time of observation (1953) the bunker contained first aid supplies and stored water but no food. American Legation personnel have observed and confirmed the existence of this structure. 201/

A second communications bunker in Budapest is located at the Joszef Telephone Exchange. 202/ Under construction from 1953 to 1956, this bunker is described as a windowless 2-story air-raid shelter 65 to 72 ft (20 to 25 m) square containing "special" telephone switchboards and equipment. 203/ [redacted] the Joszef exchange and the underground exchange in Kis Gellert Hill* had "mutual" use of the long-distance telehpone cables. 204/ If these two installations are the principal long-distance telephone terminals in Budapest, the special defensive construction is explained. 50X1

E. Industrial Enterprises.

The Csepel Steel and Metal Works (formerly called the Mannfred Weiss and later the Rakosi Metal Plant) in Budapest has within its area approximately 17 heavy, above-grade air-raid bunkers. Built during World War II, 205/ these bunkers are reported to have been strengthened in 1954, 206/ and they are now described as having reinforced concrete walls 9.8 ft (3 m) thick and roof cover 16.4 ft (5 m) thick. 207/ The average capacity of each bunker is reported to be as high as 2,000 occupants. 208/ The work force at the plant is estimated to be 30,000. 209/

The Standard Communications Equipment Plant (Beloiannisz) in Budapest has two air-raid shelters with adequate capacity for the

* See V, A, pp. 27-28, above.

4,000 persons employed there. 210/ One shelter is of the basement type and is of unknown strength. The other is a 4-story bunker built of reinforced concrete; its wall thicknesses are reported to be 4.9 to 6.6 ft (1-1/2 to 2 m) thick. Refugees have estimated its outside dimensions to be 25 to 50 m square. 211/ As a minimum, the bunker should be able to accommodate 2,400 persons. Both shelters reportedly are ventilated and have radio and telephone and first aid supplies. [redacted] 50X1
[redacted] hand tools, 50X1
stretchers, helmets, gas masks, and 300 sets of gas-protective clothing were bought by the plant in 1954 and 1955.

At the Red Star Tractor Plant (also known as Hoffer-Albert Gepyar) in Budapest an aboveground bunker was constructed during 1954-55. 212/ Specifications of wall and ceiling thicknesses are unknown, but it is said to be built of "extremely heavy" reinforced concrete 213/ and to be of "standard" construction. 214/ Considering the estimated number of employees (4,000 to 5,000), it is believed that the dimensions given as 98 ft square and 98 ft high (30 by 30 by 30 m) [redacted] are credible. A bunker of this size would provide shelter 50X1
space for more than 3,000 persons.

Adjoining the Tokol Airfield on Csepel Island in Budapest is an aircraft repair plant known as Pestvideki Gepyar. This plant area contains a reinforced concrete bunker 82 ft square and 66 ft high (25 m square and 20 m high). 215/ Four stories high, it reportedly was built during World War II 216/ and is equipped with steel doors. 217/ Its capacity should be around 1,500 persons.

At the Gamma Optical Works in Budapest, a 1,000-person bunker was constructed in about 1952. This shelter reportedly is equipped with an emergency generator and with medical and oxygen supplies. 218/
[redacted] a standard 1,000-person bunker at the Gamma 50X1
Works which was typical of the construction (see Figure 12*). 219/

The Ganz Railroad Car and Machinery Plant in Budapest has at least one air-raid bunker. 220/ Still under construction at the time of the uprising, it is described by one refugee as being cylindrical in shape, 15 m high and 15 m in diameter. [redacted] 50X1
its outer walls are 3.28 ft (1 m) thick, and the structure is entirely built of reinforced concrete. The shelter is said to accommodate between 400 and 800 persons and to have direct telephone connection to the "air defense and warning command." 221/

The Csepel Automobile Plant in Budapest allegedly has two concrete shelters of the bunker type built after World War II. 222/ Their

* Following p. 34.

dimensions indicate that these shelters have a capacity for nearly 3,000 persons.

The Obudai Shipyard in Budapest has two reported air-raid shelters, one a basement under the administration building and the other a detached shelter of unknown type. Their capacities are estimated to be 1,000 and 1,200 persons, respectively. 223/

At the Budapest Tube and Radio Plant (Orion Tungsram), [redacted] an underground complex consisting of an unknown number of rooms, some of which were 328 by 131 ft (100 by 40 m). [redacted] The center was to contain a small hospital, a decontamination unit, a communications center, a water supply, and an air filtration unit. 224/ 50X1 50X1 50X1 50X1

At the Budapest Cable Plant (Felten-Guilleaume) a 2-story bunker is located which is capable of sheltering 1,200 people. 225/

Bunkers, World War II shelters, and air-raid shelters of undefined types are reported in other Budapest factories, but limited information makes description or evaluation difficult.

Plants with lower priorities probably have been furnished with basement shelters in new or existing buildings or with detached shelters of comparable strength. Many of these have been reported in Budapest industry. In some cases they represent reconditioned World War II installations, 226/ but in others they are of new construction. 227/

F. Public Buildings and Apartment Basements.

It is certain that basement shelters were built in Budapest during 1950-56. The 1951 decree of the Minister of the Interior* required their installation in new fire-resistant buildings larger than a specified minimum size. Construction workers among the Hungarian refugees report having worked on shelters in both new and old buildings.

One Budapest refugee states, "We built air-raid shelters in the basements of state-controlled buildings that were two or more stories high, such as apartment houses, hospitals, and buildings occupied by governmental agencies." This informant also reported that during 1955-56 there were built in existing buildings RH (regihazi -- old-house) shelters, which are also mentioned in the 1951 ministerial decree.* [redacted] 50X1 50X1

* See Appendix B.

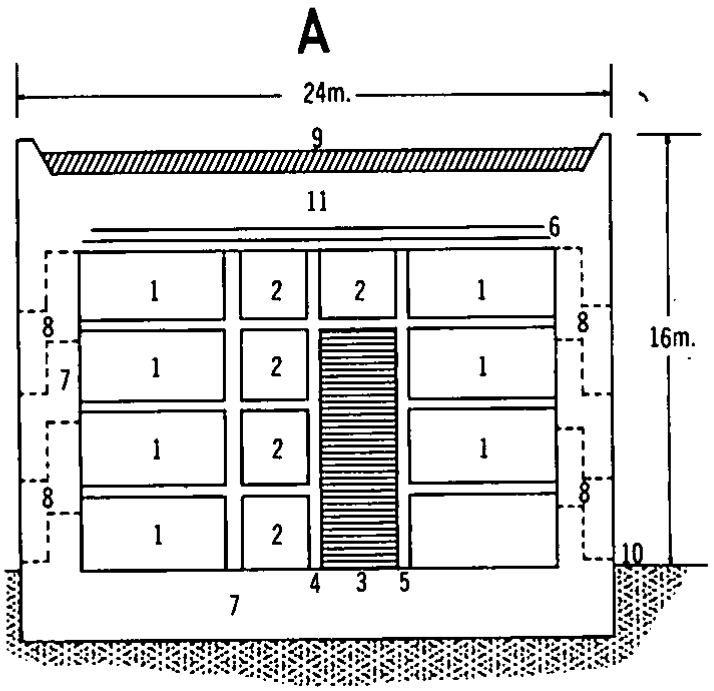
Figure 12

50X1

HUNGARY: AIR-RAID BUNKER FOR 1,000 PERSONS

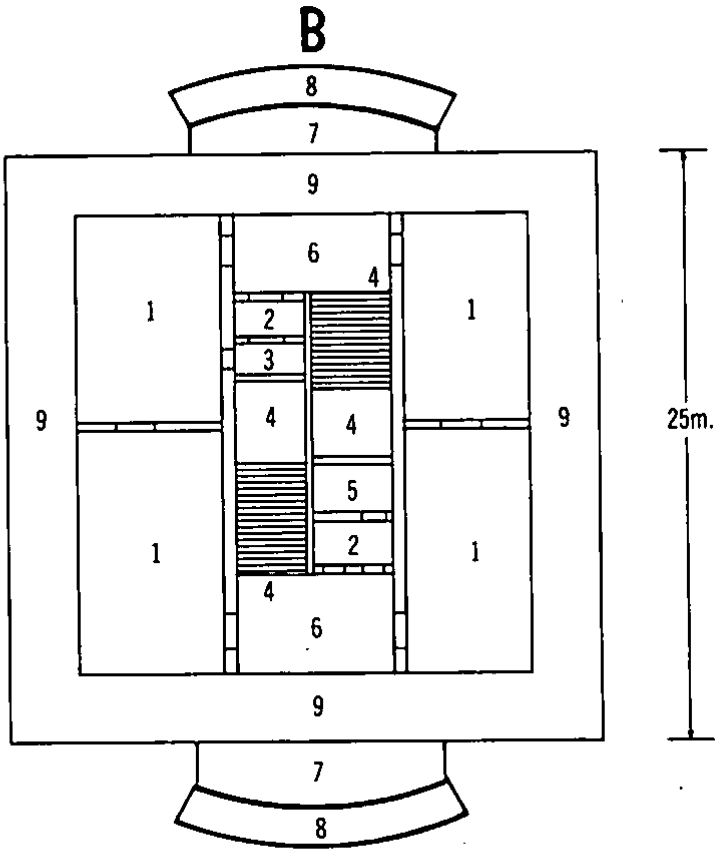
END VIEW OF THE AIR RAID BUNKER; 16 METERS HIGH.

1. Shelter areas, 3 meters high.
2. Shelter areas, 3 meters high and 6 meters by 4 meters; same areas as indicated by Point 6 of Part B below and shown in cutaway view, which partly outlines the interior staircase shown as Point 4 of Part B, below.
3. Staircase. Shown here in cutaway view which does not reveal the full extent of the stairwell and Point 2, above, as they are outlined by Points 4 and 6, respectively, of Part B, below.
4. Concrete walls, 20 centimeters thick.
5. Concrete walls, 50 centimeters thick.
6. Iron bars for reinforcement, each 19 meters long and 24 centimeters in diameter.
7. Concrete walls and foundation, 2½ meters thick.
8. Air pipes, each 20 centimeters in diameter.
9. Reinforcement consisting of basalt blocks; the basalt reinforcement layer extended to a depth of 1 to 1½ meters; each basalt block measures 30 centimeters in width, length, and height.
10. Ground level.
11. Concrete roof, 2½ meters thick.



TOP VIEW OF THE AIR RAID BUNKER; DIMENSIONS 24 BY 25 METERS.

1. Shelter areas, 6 by 10 meters.
2. Toilets, two on each floor.
3. Air-conditioning control room; 3 by 5 meters and 3½ meters high; on the ground floor.
4. Staircases and hallways. This section occupied the same column of space downward thru each story.
5. Power generators; on the ground floor.
6. Shelter areas and hallways: 6 meters by 4 meters and 3 meters high.
7. Entranceways, 6 meters wide and 2½ meters high.
8. Protruding protective entrances of concrete, 3 meters high; protective entrance protruded 3 meters from bunker.
9. Concrete walls, 2½ meters thick.



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50X1

In March 1956 a member of the American Legation observed a site in downtown Budapest where construction of air-raid shelters under two adjoining buildings was in progress. 229/ [redacted] 50X1
[redacted] air-raid shelters were being 50X1
constructed under various Budapest buildings, 230/ and numerous refugees were familiar with the practice. 231/

VI. Shelters in Other Areas.

The air-raid shelters constructed or reconstructed and improved in the remainder of Hungary show a pattern similar to that evident in the metropolitan area of Budapest. [redacted] 50X1
[redacted] 50X1
[redacted] Certainly, some major industrial 50X1
installations have been provided with heavy shelters, and it would be dangerous to assume that other shelters have not been provided merely on the ground that they have not been reported.

A. Tunnel and Gallery Systems.

Information concerning an alternate dispersal site for the Hungarian government is inconclusive. [redacted] 50X1
[redacted] an underground system at Lillafured (48°05' N - 20°37' E) 232/ 50X1
which was redeveloped from existing caverns and shelter during 1950-54. 233/ This location is also frequently reported to be an underground air defense center, 234/ and it may be a joint installation.

Excavations or shelters of the gallery type in cities have been reported in Miskolc, 235/ Baja, 236/ Papa, 237/ and Veszprem. 238/ These, however, may be special installations for military or control purposes. [redacted] galleries in the Avas Hills 50X1
(formerly wine cellars) 239/ are air defense locations for an emergency hospital and the police. 240/

B. Government and Communist Party Shelters.

[redacted] difficult to determine the characteristics and purposes of air-raid shelters in Hungarian cities outside Budapest. Heavy bunker (BGS) shelters are not usually associated with Communist Party and government installations. Basement shelters under administrative buildings are reported most often. 50X1

[redacted] 50X1

[redacted] in Szeged new shelters were under construction before 1954 beneath the post office, city hall, and police headquarters and that old shelters were being cleared. 243/ [redacted] a shelter under the police building in Szentgotthard in 1953. 244/ [redacted] unidentified shelters from Sopron, 245/ and others are reported in Esztergom, 246/ Gyor, 247/ Miskolc, 248/ and Galambok. 249/ [redacted] civil air defense headquarters under the following buildings: the city hall, a county building, the "finance ministry," and military barracks. [redacted]

50X1

C. Transport and Communications.

[redacted] at least three types of air-raid shelters have been constructed in Hungary in connection with railroad installations. These shelters include the heavy BGS bunkers; some smaller bunkers for limited numbers of operational personnel; and "splinterproof" shelters, probably shelters of the basement type or detached shelters of comparable strength. It is probable that shelters for operating railroad personnel and for essential communications have been given high priority.

50X1

Heavy concrete bunkers 2 to 4 stories high are reported by one refugee as being built or under construction in 1956 at railroad stations and terminals in Szekesfehervar, Hatvan, Szolnok, Debrecen, and Gyor. [redacted]

50X1

Small bunkers with capacities estimated to be from 3 to 30 persons, probably for railroad operating personnel, are reported from at least 6 locations. 257/ [redacted] all railroad stations had this type of shelter. 258/ [redacted] some railroad stations have been provided with basement air-raid shelters, possibly of earlier construction. 259/

50X1

D. Industrial Shelters.

[redacted] shelters of the BGS bunker type at the Sztalinvaros Iron and Steel Plant. 260/ [redacted]

50X1

[redacted] one completed bunker, one nearly complete (1956), and another building under construction (1956) which might be a third bunker. 261/ [redacted] in 1954 one bunker had been built and a second was under construction in the plant area. 262/ Estimated sizes of bunkers in this plant vary from 98 to 130 ft (30 to 40 m) square, with 33 ft of the structure aboveground and 33 ft beneath the surface. 263/ [redacted] "atomproof" bunkers with capacities of 1,000 persons each. 264/ The capacities of the plant shelters should be well over this figure. 50X1 50X1 50X1 50X1 50X1

The Gyor Machinery and Railroad Equipment Plant has at least one large bunker. [redacted] the bunker as follows 265/: 50X1

> Air-raid shelter: Square, 30 by 30 m /98 by 98 ft/, 15 m /49 ft/ high to the eaves, vertical walls and dome-shaped roof; construction completed in 1954. Reinforced concrete walls 2.5 m (8.2 ft) thick, dome solid reinforced concrete 8 to 10 m (26.2 to 33 ft) thick at highest point. The partition walls, also of reinforced concrete, were 1 m (3.3 ft) thick. The bunker had 6 floors, each with 16 rooms; each room was fitted with rows of wooden benches and could hold 12 to 16 people ... four entrances ... .

[redacted] a bunker at this plant [redacted] contains an electric powerplant, 266/ small arms storage, a telephone exchange, 267/ and ventilating equipment. 268/ 50X1 50X1

Two refugees report heavy shelters at the Diosgyor Steel and Engineering Works, one identifying a single bunker 269/ and the other identifying two bunkers. 270/

[redacted] 50X1

Unconfirmed industrial bunkers include those described as being of recent construction at two aluminum plants -- Inota 272/ and Almasfuzito. 273/ The former is stated to contain communications and emergency supplies. Several other bunkers have been reported in additional Hungarian plants. 274/

Underground or hillside galleries, a variation of heavy shelters of the BGS type, are located principally at ammunition factories such as those at Fuzfo, 275/ Jobbagyi, Sirok, and Felnemet. 276/ A chemical

plant at Kazincbarcika also has shelters built into hillsides which border the plant area. 277/

Two underground shelters at mining locations are thus far unconfirmed. One is reported at a uranium mine in Pecs 278/ and the other near a coal mine at Izsofalva. 279/

As in Budapest, basement shelters of either World War II or more recent construction are reported in industrial enterprises in various communities of Hungary. [redacted] 50X1
[redacted] an enterprise built air-raid shelters "in the course of its routine work in accordance with the general regulations governing the construction of factory buildings" 280/; [redacted] 50X1
"Factories and military barracks in Miskolc all had concrete basements for air-raid defense" 281/; [redacted] 50X1
[redacted] World War II air-raid shelters have been cleaned and that all new construction includes basements which could serve the same purpose. 282/ [redacted] 50X1
[redacted] 50X1

E. Apartment Basements.

Reports on basement shelters in Hungary include such general statements as those which follow. "The principal civil defense meaure in Komlo was construction of air-raid shelters in all new buildings." 284/ "Every apartment house built in Hungary since 1945 has had an air-raid shelter included in the basement." 285/ "An ordinance has been in effect since at least 1949 which directs that the construction of all new houses is to include a civil defense shelter. In the case of apartment houses, practically all such shelters consist of reinforced concrete areas located in the basements of the buildings. By ordinance these shelters must be large enough to hold all the occupants of the apartment house... ." 286/

[redacted] apartment basement shelters in 50X1
the cities or towns of Veszprem, Nagylengyel, Almasfuzito, 287/ Sopron, Nagykanizsa, Zalaegerszeg, 288/ and Sztalinvaros. 289/

APPENDIX A

DECREE NO. 01/67-1951 VI OF THE HUNGARIAN MINISTER OF THE INTERIOR*

Decree No. 01/67-1951 VI of the Minister of the Interior concerning the construction of TGS (tormelek, gaz es szilankbiztos /-- debris-, gas-, and splinterproof/) shelters in residences and public buildings.

1. Establishment of Shelters.

a. TGS shelters must be established in all newly constructed residences and public buildings, or in those to be reconstructed or remodeled, for which the civil defense group exceeds 30 persons, based on 2, d,** and which are suitable technically for the installation of shelters as set forth in 6, a.***

b. Decree No. 01/20-1951 VI of the Minister of the Interior, governing the civil defense of industrial plants, deals with industrial plant shelters separately. However, the technical requirements of TGS shelters as set forth here will also refer to TGS shelters in industrial plants.

2. The Parts of the Shelter and the Civil Defense Group.

a. The shelter consists of an antechamber and an interior area. One antechamber and 3 interior areas, each with a capacity of 50 persons at most, comprise a shelter unit. In 1 shelter unit, therefore, a maximum of 150 persons can be accommodated.

If the antechamber opens directly onto the stair well, an open corridor, or the outside, a gaslock should be installed behind the entrance door of the antechamber. The area of the gaslock should be at least 2 sq m, and it should be set off from the antechamber by a gasproof door placed in a wall 25 cm thick.

b. At least 30, and at most 50, people may be placed in one interior area. If the ground plan of the shelter cannot be arranged with openings from the antechamber into all the interior areas to insure peacetime use and economic utilization of space, then the interior areas may open onto each other. However, only one interior area may be reached from another. If several shelter units are built within the basement of one building, they should be as far apart as possible. To make sure that they are some distance apart, there should be a layer of

* 290/. For the sake of clarity, minor changes have been made in the translation of the original document.
** P. 40, below.
*** P. 44, below.

dirt or a room, at least 2.5 m wide, not being used for shelter purposes, between each shelter unit and the next. The walls of the rooms dividing the shelter units should be of reinforced concrete, 25 cm thick, reinforced with No. 8, 10-cm mesh reinforcing on both sides and tied into the main walls of the building by inserting the rounds into the gaps of the brick wall. One of these rooms may also serve as the shelter antechamber if sufficient space is not available. If more than two shelter units are set up next to each other in this way, a central area in the basement, not touching the exterior walls, must be formed if possible /for the shelter units/, and the basement pipes must be run in the outer area. This latter arrangement is preferable in establishing 1 or 2 shelter units, if peacetime use and economy will permit it.

c. Centrally located public shelters must be available for blocks of houses, for groups of smaller residences, or for other groups of buildings (settlements) if separate shelters in each building are either impossible for technical reasons or impractical for reasons of economy. These must be built only for the /civil defense/ staff /when/ ordered by the separate decree of the Ministry of the Interior.

d. The civil defense group of a building is determined by the following method:

(1) In residence buildings it is necessary to count on 1 person per 8 sq m of area in residences of 2 rooms or smaller and on 1 person per 10 sq m of area in residences of 3 or more rooms. It is not necessary to include the areas of secondary rooms (receiving hall, toilet, kitchen, and bath) in the area of the rooms. Base areas are computed by measuring between the plastered wall surfaces.

(2) In residence buildings where there are rooms used for business, as workshops, or for similar purposes, 1 person per 20 sq m of used area must be counted.

(3) Shelters for industrial plants and for other buildings in which the establishment of TGS shelters is obligatory must be planned for the maximum force present in the building or in the plant area during an alert. In establishing the civil defense staff for industrial plants, a possible regrouping of the shifts must be considered to reduce the staff. The civil defense staff for offices located in residence buildings must be determined in the same manner.

e. The shelters must be constructed and completely outfitted concurrently with the construction of the building, but they may also be used for peacetime purposes. Only such peacetime usages are permitted which can be halted immediately if necessary and which will allow the

return of the shelter to its primary purpose within 24 hours. Those peacetime uses of the shelter which do not impede its original purpose and which can be continued during an alert are especially desirable.

3. Shelter Size.

a. The base area of the antechamber should be 0.1 sq m times the number of persons which can be accommodated by the interior areas of a shelter unit where there are 2 interior areas and 0.13 sq m where there are 3. In any case, the base area should be at least 4 sq m. The narrowest part of the antechamber should be 1.5 m. The height of the antechamber and of the interior area should be at least 2.2 m. Where there is a ceiling ribbed on the underside, the lower plane of the ribs should be at least 1.9 m from the basement floor. The route leading to the shelter and to the antechamber should be so laid out that a stretcher, 0.51 x 2.26 m, can be carried into any interior area.

b. The interior base area should be 0.75 sq m per person and the airspace 2.5 cu m per person. If the responsible officials permit the use of air filter equipment and if it is installed when the shelter is built, the base area per person may be reduced to 0.6 sq m and the airspace to 1.6 cu m.

c. If the airspace of the interior areas is smaller than that computed to be necessary, an auxiliary airspace of the size necessary to make up the deficit must be connected to the airspace of the interior areas from the basement sections outside the shelter. Openings in the auxiliary airspace which open onto the outside must be closed with gasproof securing devices or walled up. The connecting of the interior areas with the auxiliary airspace is to be done with 25 x 25-cm or 30 x 30-cm openings placed one above the other. These should be capable of being secured with gasproof locks from within the interior area. These openings should be at the point farthest from the entrance.

d. The area of an internal space should be at least 24 sq m; the height, 2.20 m; and the narrowest width, 2.20 m.

e. One square meter per 30 persons must be set off in the interior areas for pit /portable?/ latrines, closed off by a single curtain. In setting up the interior area airspace it is not necessary to subtract the cubic area of the latrines.

f. An open area of at least 2 sq m must be left in the antechamber for the placement of equipment.

4. Entrances and Emergency Exits.

a. A basement containing a shelter must open onto a stair well or other closed area. These closed areas along with the door openings can serve as entrances to the shelter.

b. The entrance door of the antechamber should be one door, opening outward, per 150 persons. The door should be placed in a corner in such a way that it will be flat against the wall when open; it should be capable of being unhinged from inside. The interior area doors should also be placed in corners if possible, and they should open /outward/ from interior areas into the antechamber.

c. Each independent shelter unit should have at least two emergency exits. One of these may be the emergency passage treated in g, below. Where shelter units are built next to each other, fewer emergency exits may be made if they still afford possibilities for escape from all interior areas in the event that some parts of the building are destroyed. To insure this, neighboring shelter units must be connected by emergency passages. Emergency exits should be relatively far apart and on opposite sides of the building.

d. The shelters of row buildings must be equipped with vertical emergency exits if emergency exits cannot open onto the outside from the shelters. For reasons of material economy, vertical emergency exits may be built only in inportant buildings.

The vertical emergency exit is a reinforced concrete cylinder with walls 25 cm thick and with an interior diameter of 0.90 m. It extends to the ceiling of the second floor, and it has openings at the ground level and at the top. The exits should be two-thirds the height of the interior areas. The reinforced concrete cylinder must be built with exterior and interior reticular reinforcing with a mesh of 20 x 20 cm. It must have an angle brace connection at the basement ceiling level and a hinged connection at the level of the second floor ceiling. The exterior lengthwise reinforcing is number 10 steel rounds; the interior, number 8 rounds; and the exterior and interior circular reinforcing, number 6 rounds. The reinforced concrete cylinder must be equipped with built-in steel ladders, inside and out.

e. The openings of the emergency exits should be beyond the ranges of destruction which can be expected in the building or neighboring structures. For important buildings, emergency tunnels 0.8 m wide and 1 m high, or tubular tunnels with an interior diameter of 0.9 m, must be built to lead to open areas.

f. If splinters, coming in a straight line, can reach the interior area through the emergency exit openings, regardless of the fact that the openings are covered, then exterior or interior splinterproof walls must be built to cover the openings. The splinter wall should afford protection against the impact of splinters flying in a horizontal direction. The distance between the splinter wall and the emergency exit should be 0.80 to 1 m. Brick walls laid with improved mortar 51 cm thick, or vibrated reinforced concrete walls 35 cm thick containing at least 200 kg of cement per cubic meter, can be considered splinterproof.

g. Adjacent basement areas of neighboring buildings must be connected by emergency passages. These passages are vaulted openings measuring 0.7 to 0.8 m, walled with bricks. To insure easy removal of the walling, they must not be tied to the existing walls. The plane of the walling on one side should not coincide with the plane of the main wall.

5. Devices to Secure Openings.

a. The following are the devices which secure the shelter openings:

(1) The entrance door leading into the antechamber (antechamber door), with interior dimensions of 0.85 x 1.85 m.

(2) The door leading from the antechamber into the interior area (interior area door), with interior dimensions of 0.85 x 1.85 m.

(3) The windows which close the openings serving as emergency exits (emergency exit windows). The dimensions of the small emergency exit windows are 70 x 50 cm and of the large, 70 x 85 cm. The emergency exit windows fit against the outer surface of the wall and open outward.

b. From the point of view of protection, the devices which secure the openings protect against gas and air pressure (GL) /gaz es legnyomas/ or only against gas (G) /gaz/. Openings in the outer walls of a shelter unit must always be closed off with GL devices which open outward, and within the shelter unit G doors must be used. Doors between interior areas and the antechamber should open outward into the antechamber.

c. If, in addition to the emergency exit windows and the antechamber door, more openings in the outer walls of the shelter are necessary for its peacetime usage, either they must be equipped with GL devices or they must be so formed that, if necessary, they can be walled up by bonding into the grooves cut previously in the wall. Basement sections which serve as shelters may be prepared without windows. Shelters should be equipped with only the absolutely necessary openings.

d. To ventilate the shelter, at least one Z-shaped ventilation opening may be cut in the interior area wall which borders on the outer

airspace. This opening should have a cross section of 7 x 14 cm and should be fitted with a grill on the outside and a small gasproof door on the inside.

e. The devices which secure the shelter openings are to be of steel or prefabricated reinforced concrete. Both types are equipped with angle iron frames placed in the wall. Regulation No. MOSZ 800 /Magyar Orszagos Szabvany -- Hungarian National Regulation/ prescribes the dimensions and structure of the frame. Reinforced concrete shelter doors and emergency exit windows cannot be considered splinterproof.

6. Shelter Roof and the Building Above the Shelter.

a. TGS shelters may only be built in the basements of buildings where there are at least three covers /floors and roof/ of noncombustible materials above the shelter ceiling.

b. In buildings with brick walls a cornice beam must be used with the shelter roof as well as with the uppermost roof.

c. The floor level of the roof over the /basement/ shelter may not be more than 1.20 m above the lowest ground level. If this requirement cannot be met because of the subterranean water level, a fill with a height corresponding to a crown width of at least 3 m must be made at the outer wall of the shelter. The upper plane of the fill must be regarded as the exterior ground level.

d. If the stairs in a building housing a shelter are built of prefabricated units, either the extended rounds must be cemented into the supporting structure or the individual units must be connected to each other and to the supporting structure by screws and other connecting devices.

e. A so-called "civil defense roof" with an increased load-bearing capability must be built over the shelter and the access route leading to it. The civil defense roof is made of reinforced concrete at least 15 cm thick, with a 20 x 20-cm reticular mesh reinforcing of 8-mm steel rounds cemented in at the place of use (not prefabricated). It may be either a reinforced concrete sheet /slab/ or underribbed reinforced concrete, in either case made to support a doubly directed load of the amount prescribed by civil defense regulations. The lower mesh reinforcing /next to the ceiling/ may be counted in with the structural reinforcing, but it may not be substituted for by a wider mesh reinforcing of rounds of the same size.

f. In addition to its own weight, the roof over the shelter and its access route must be planned to carry the following evenly distributed loads:

(1) In nonsteel structures, a load totaling 1,000 kg per sq m for the ground and second stories and 250 kg per sq m for each additional story.

(2) In steel structures, a load totaling 1,000 kg per sq m for the ground, second, third, and fourth stories and 100 kg per sq m for each additional story.

g. Beyond the loads given above, the useful load of the roof must be considered only if there is a large concentrated load (heavy machines) operative on it.

h. The low cost of the civil defense roof must be insured by the use of heavy braces or small spans.

i. The concrete used in a civil defense roof should be at least of B 200 quality, and the steel rounds used should be of at least 36.22B or 36.24B quality.

j. In planning the civil defense roof, the load must be calculated with a safety factor of 1.1, and it must allow for the extreme tensions stated in the regulation covering reinforced concrete.

k. In special cases, for which the Ministry of the Interior will make separate arrangements, a dirt fill 1 m thick must cover the shelter roof. In this case, the height of the first-story floor level should not be more than 1.2 m above ground level. If the basement cannot be built at the necessary depth because of a high water level, refer to 6, c.* In planning the roof, the weight of the dirt on the roof must be considered independently of the civil defense load.

7. Shelter Walls.

a. If the height of the ground mass placing ground pressure on the walls of the shelter and access routes is more than 3 m, the shelter walls (without the load-discharging effect of the walls and ceiling) must be planned for a ground pressure computed by assuming a ground level burdened with the same load as the civil defense load of the shelter roof.

b. If the height of the ground mass placing ground pressure on the exterior walls of the shelter and its access route is less than 3 m, it is not necessary to plan for the ground pressure, but the following requirements must be met:

The thickness of walls of stone or of mixed materials should be at least 60 cm, with mortar containing 250 kg of cement per cu m.

* P. 44, above.

The thickness of walls of fired clay brick should be 51 cm, with a mortar containing 250 kg per cu m.

Where vibrated concrete containing 180 kg of cement per cu m is used, the walls should be at least 40 cm thick.

Reinforced concrete walls without bracing pillars should be 30 cm thick, and those with pillars should be 20 cm thick.

c. The shelter roof must be cemented in with a cornice beam, reinforced according to regulations, extending the full width of the basement. If the building is of reinforced construction, the shelter walls should be vibrated concrete walls tied into the reinforcing with cemented-in straps, or brick walls 51 cm thick.

d. The walls between interior areas of a shelter should be at least 25 cm thick if they are walls of fired clay brick laid with portland cement mortar. They should be at least 20 cm thick if they are vibrated concrete walls containing 200 kg of cement per cu m.

e. The interior walls of shelter units should be either walls of fired clay brick laid with a mortar containing 100 kg of cement per cu m or reinforced concrete walls as described in 2, b.*

f. The shelter ceiling must not be plastered. The shelter walls must be plastered. The ceilings and walls should receive three coats of whitewash.

8. Shelter Floor.

The antechamber and interior areas of the shelter should have a smoothed concrete floor or paving placed into cushion concrete. The cushion concrete must be poured at least 10 cm thick and, for support, must be tied into the walls.

9. Pipes Running Through the Shelter.

a. If possible, pipes of various types (central steam and hot water heat, water, and sewer) should not run through the shelter. Sometimes this requirement cannot be met, however, so only thick-walled mild steel pipes will cross in the shortest route. Brittle pipes must be fitted with a reinforced concrete protective covering, with both ends terminating outside. To close pressure branches, main locks must be built which are easily manipulated from the shelter. Valves to prevent infiltration of gas must be built in sewer pipes.

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* Pp. 39-40, above.

b. The passing of gas pipes through a shelter is forbidden. If gas pipes pass through a shelter already built, or if there are gas meters there, these must be completely isolated from the shelter by walls around them.

c. At least one chimney terminus outside the shelter area should be in a basement housing a shelter. A chimney soot-door and other openings extending into the shelter must be gasproof.

10. Shelter Lighting.

If there is electric lighting in the building housing a shelter, it must be run into the shelter.

11. Closing Instructions.

a. The instructions herein shall be used for all residences and public buildings built in municipal or industrial areas except that where there is a ground water level above 1.5 m, when 6, c,* will not satisfactorily meet the problem, shelters must be built only under certain buildings after permission of the Ministry of the Interior has been obtained. This must be done in such a way that the buildings without shelters will also aid in supplying the civil defense group.

b. The Ministry of the Interior may permit deviations from the statements of this decree, where justified.

c. This decree goes into effect on 31 December 1951. The following decrees are herewith void:

B.M.A.-4374-5/9. 1950
Biz. 4374-84/1950. VI/4
Biz. 4374-136/1950. VI

* P. 44, above.

APPENDIX B

DECREE NO. 0138-952 VI OF THE HUNGARIAN MINISTER OF THE INTERIOR*

Decree No. 0138-952 VI /no date/ of the Minister of the Interior concerning the establishment of emergency shelters.

1. General Instructions.

a. Emergency shelters are old-house /regihazi/ (RH) shelters established in the basements of existing buildings and trench shelters built underground in open areas.

b. RH shelters are differentiated from TGS /tormelek, gaz es szilankbiztos -- debris-, gas-, and splinterproof/ shelters in order that certain relaxations of principles of Decree No. 01/67-1951 VI of the Minister of the Interior** may be permitted.

2. Determining the Site of an RH Shelter.

a. If possible, the RH shelter should be located in an interior section of the basement not bordered by outside walls. It should be in that part of the basement over which there are the most floors.

b. If it is impossible, because of the structural layout of the building, to establish the shelter as prescribed in a, above, then it must be located along the firewall bordering the next building at a point where it may be easily reached from the stairs, doorway, or courtyard.

c. If possible, the shelter should be in a part of the basement where there are no gas and water pipes.

d. The shelter must be located in an extended arrangement /multiple compartments?/ with its components divided by the existing structural walls. Connections between shelter units, by way of the basement sections outside the shelter, and between the shelter and emergency exits or emergency passages must be assured. If there are several shelter units located within the basement of a single building, they should be as far apart as possible, with a space between them at least 2.5 m wide which is not being used for shelter purposes.

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* 291/ For the sake of clarity, minor changes have been made in the translation of the original document.

** See Appendix A.

e. Where possible and where permissible under the requirements of this decree, the shelter must be built in basement areas used as RH shelters during the last war.

3. Shelter Components and the Civil Defense Group.

a. The shelter consists of an antechamber and interior areas. One antechamber and a group of interior areas, each accommodating a maximum of 70 people, make up a shelter unit. One shelter unit may accommodate a maximum of 210 people.

b. The interior areas should if possible open onto the antechamber, but if this is not feasible because of the structural layout, they may open onto each other.

c. If the shelter has only one interior area and the entrance opens into the shelter from the building interior, the entrance may open directly onto the shelter interior area, omitting the antechamber. However, in such cases, gaslocks must be installed as necessary to replace the antechamber.

d. The shelter must be set up for a civil defense group, the size of which is determined in the following way:

(1) In residences of 2 or fewer rooms, 1 person must be estimated per 8 sq m of living area. Where there are 3 or more rooms, 1 person must be estimated per 10 sq m of living area. It is not necessary to include the area of auxiliary rooms (receiving hall, toilet, kitchen, and bath). If there is a hall in the residence, it is to be counted as a room. The base areas are computed by measurements between the plastered wall surfaces.

(2) Shelters in industrial plants, public buildings, and other institutional buildings requiring the installation of TGS shelters must be planned for the maximum staff working in the building or in the plant area during the period of a civil defense alert. In determining the size of the civil defense group, the possible regrouping of shifts must be considered in order to reduce the civil defense group. The civil defense group for offices /or those/ located in residences must be determined in the same way.

e. Shelters should be set up in such a way as to permit peacetime use; however, only those peacetime usages which can be terminated immediately, returning the shelter to its primary purpose within 24 hours, may be allowed. An ideal peacetime use is one which does not hamper the intended shelter use and which can continue during civil defense preparations.

4. Shelter Size.

a. The smallest width of the antechamber should be 1.20 m and the smallest area, 4 sq m. The lowest permissible height of the antechamber and the interior area is 1.80 m. There may be an antechamber passage section which can be closed off by doors.

b. The base area per person of the interior area is 0.75 sq m and the airspace, 2.50 cu m. If the authorities permit the use of air-filter equipment and if it is installed at the same time the shelter is constructed, the base area per person may be reduced to 0.6 sq m and the airspace to 1.6 cu m.

c. If, after computations are made, the airspace required is greater than the existing airspace of the interior areas, then an auxiliary space of the proper size must be connected to the airspace of the interior areas from a basement area outside the shelter. Openings onto the outside in the auxiliary airspace must be either walled up or fitted with gasproof securing devices like those on the shelter openings. The auxiliary airspace is connected with the interior areas by means of gasproof openings which can be secured from inside the shelter. These openings should be at least 25 x 25 cm, one placed higher than the other.

d. One square meter for each 35 persons housed in an interior area must be set off for pit /portable?/ latrines, closed off by a curtain and possibly located in a wooden compartment. In computing the airspace of the interior areas, it is not necessary to subtract the cubic area of the section closed off by the curtain.

e. An open space of at least 2 sq m must be left in the antechamber for the placement of equipment. If this cannot be done because of the structural layout, then the space may be set aside in the interior area.

5. Entrances and Emergency Exits.

a. If there are openings from a basement to the outside, the shelter must be situated so that it is accessible from the stairs or from another closed area. If the basement is reached from a closed area, its entrance may open directly onto the antechamber of the shelter.

b. Preferably, there should be at least one door opening outward in the antechamber for each 150 persons. The doors should be placed in corners and should be hung in such a way that they will lie flat against the wall when open and can be unhinged from inside. Doors of the interior areas should also be placed in corners if possible and should open outward from the interior area into the antechamber.

c. Each separate shelter unit should have at least two emergency exits. These may be the emergency passages discussed in g.* Where shelter units are located next to each other, there may be less than two exits per shelter if the exits are placed so that there will be opportunity for egress from any interior area in case of destruction of some sections of the building. To insure egress, shelters next to each other must be interconnected. Emergency exits should be located fairly far apart and on opposite sides of the building. If possible, they should be beyond the limits of possible debris from nearby buildings.

Emergency exits should be in basement areas removed from the shelter entrance. The emergency exit should be a basement window, 70 x 50 cm, which can be secured with a GL (gaz- es legnyomasbiztos /-- gas- and air-pressure-proof/) door, which is so placed that splinters coming from any direction will strike a brick wall at least 1-1/2 bricks thick. If this is impossible because of the layout of the building, then a splinter wall must be built in front of or behind the emergency exit.

d. All shelter openings, as well as those of the auxiliary airspace connected to the shelter, which open on the outside must be secured with gas- and splinterproof devices. Any cracks through which there is direct contact with outer air must be sealed with gasproof sealing. Securing of openings is done by walling them up or by fitting them with covers.

e. Basement windows used for peacetime purposes and not used for emergency exits may be walled up with walls built in front of or behind them, or in the wall. Walls in front of and behind openings should be anchored into the main wall with straps made from steel rounds. The walling up of the openings must be done with indented tie-ins on both sides of the existing wall. For ventilation, a Z-shaped shaft must be cut in a walled-up opening.

f. If necessary, the following devices will serve for gas- and splinterproofing:

(1) A layer of dirt 70 cm thick or a layer of sand at least 50 cm thick supported by round timbers, 10 cm in diameter, between planks.

(2) A stack of logs 40 cm thick made up of timbers at least 10 cm in diameter, supported between piles driven outside the opening to be protected.

These solutions will be used only in exceptional cases, because they are easily damaged and require constant maintenance.

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* P. 53, below.

g. The shelter should connect with all parts of the basement. Emergency passages must be made between the basements of buildings containing shelters and the basements of neighboring buildings. These emergency passages are 70 x 80 cm in size, walled with brick laid with lime-mortar. To insure easy removal, the walls may not be tied into the existing structure walls. The plane of the "walling-in" /knock-out/ on one side should not coincide with the structure walls.

6. Devices to Secure Openings.

a. The following devices are used to secure the shelter openings:

(1) The entrance leading into the antechamber (antechamber door).

(2) The door leading from the antechamber into the interior area or areas. The inner dimensions of both doors are 0.85 x 1.85 m.

(3) The windows used to secure the emergency exit openings. The dimensions of the small window are 70 x 50 cm and of the large window, 70 x 85 cm. These windows fit against the outer surface of the wall and open outward.

b. The securing devices, which offer protection against gas and air pressure (GL) or only against gas (G). All openings on the outer walls of shelter units must be fitted with GL devices opening outward, and, within the shelter units, G doors must be used. Doors between the interior areas and the antechamber should open outward.

c. The securing devices, which are of steel or prefabricated reinforced concrete. Both types are hung in angle iron frames placed in the wall. The dimensions and execution of the securing devices are prescribed by Regulation No. MOSZ 800 /Magyar Orszagos Szabvany -- Hungarian National Regulation/. The claws used in walling in the angle iron frames must be carefully cemented into grooved holes.

7. Shelter Roof and Its Dimensions.

a. The level of the roof over the shelter may be 1.5 m above the level of the ground at most. If its elevation is 1.2 m or less, the shelter wall should be at least 51 cm thick, and if it is between 1.2 and 1.5 m, the wall should be at least 63 cm thick. If the walls are thinner than these requirements, they must be strengthened with interior or exterior buttressing. The strengthening wall, regardless of the thickness of the wall which it braces, should be at least 38 cm thick and laid in cement mortar.

b. If the elevation of the shelter roof is between 0.5 and 1.5 m above ground level, the roof over the shelter should be made of at least

two noncombustible materials. If the elevation is 0.5 m or less, the roof should be of at least one such material.

c. The roof over the shelter, its access route, and the routes to the emergency exits and passages must be planned for the following evenly distributed loads of debris in addition to the roof's own weight:

(1) In nonsteel structures, a total of 1,000 kg per sq m for the ground and second floor and 250 kg per sq m for each floor above these.

(2) In steel structures, a total load of 1,000 kg per sq m for the ground, second, third, and fourth floors and 100 kg per sq m for each additional floor.

d. It is necessary to consider the useful load capacity of the basement roof in addition to that of the loads above only when there are heavy machines or concentrated loads on upper floors.

e. Flat roofs are strengthened by bracing the roof ribs or roof girders. When possible, the bracing must be done by brick pillars or interior dividing walls. In special cases the roof girders can be braced by wooden beams held in place by wooden supports.

In determining the size of the bracing devices, except for arched bracing, the permissible tensions must be increased by 50 percent. Basement ceilings having multiple spans must be planned for the most dangerous load produced by shifting debris and dead /static/ loads.

f. Reinforced concrete girders and sheets may be braced at the center of the open span or at some other point if there is no reinforcing over the bracing sufficient to absorb negative pressures. It is only necessary to consider whether the lower reinforcing of the doubly supported beam thus formed is suitable to absorb the positive flexing pressures which arise.

g. Most barrel vaults of the usual dimensions will satisfy the civil defense load without strengthening. It is only necessary to support the side walls against the lateral pressure of the vault. The load capacity of a vault cannot be increased by bracing it, nor can the lateral pressures be significantly reduced in this way. Therefore, vaults are not to be braced.

h. All existing walls within the area in which the shelter is to be placed that are at least one brick thick can be used as dividing walls within the shelter. The outer walls of the shelter should be at least 51 cm thick.

i. The old plaster on the ceiling over the shelter must be removed, and the lower surface of the ceiling must be whitewashed. Plaster on the walls must be left intact.

8. Pipes Running Through the Shelter.

a. If at all possible, central steam and hot water heating pipes or water or gas pipes should not run through the shelter. This requirement cannot always be met, however, and when it cannot, then thick-walled mild steel pipes will cross by the shortest route. Brittle pipes must be covered with a reinforced concrete protective covering, with both ends of this covering terminating outside. Main locks for closing the pressure branches, easily manipulated from the shelter, must be built in. Valves to prevent infiltration of gas must be built into the sewer pipes.

b. The running of gas pipes through the shelter is forbidden. If gas pipes cross an already-existing shelter, however, then the pipes and the meters also, if they are within the shelter, must be completely set off from the shelter by walls.

c. In basements containing shelters, there should be at least one chimney terminus in the shelter area. Chimney soot doors or other openings must be made gasproof with securing devices.

9. Construction of Trench Shelters.

a. The complete trench shelter is /dug/ at least 2 m below the ground surface. A trench shelter may be an open or covered trench, flaring out at the top to a width of 1.2 m.

b. When possible, the trench shelter should be gas- and splinterproof. For this reason, the roof must be covered with a layer of dirt at least 50 cm thick, and gasproof antechambers must be set up at the entrances. Open trench shelters should not be used if they can be avoided.

c. The trench shelter consists of a number of sections, each at most 8 m long, arranged symmetrically in a zigzag pattern along a straight axis. The individual sections must be separated by gasproof doors if possible. The distance between the axes of several parallel trench shelters must be at least 10 m and preferably 40 m.

d. One trench shelter may consist of 5 straight sections at most, with a maximum capacity of 150 people.

e. If the capacity of the shelter is more than 50 people, entrances at both ends must be set up, and if it is less than 50 people, an emergency exit may be substituted for one entrance.

f. The structure of a trench shelter may be reinforced concrete poured at the site, prefabricated concrete units, brick circular vaulting, or wooden bracing similar to mine shafts.

g. Trench shelter benches must be arranged so that their backs are independent of the shelter structure.

h. The execution of trench shelters as described above should be undertaken only if the Ministry of the Interior hands down a separate ruling for it.

10. Closing Instructions.

The Ministry of the Interior, in special cases, may permit deviations from the standards contained in this order.

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