

NBSIR 74-432

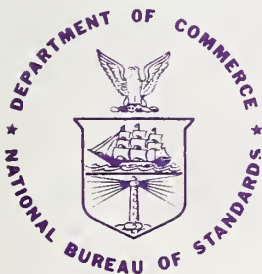
1972 International Activities Center for Building Technology

Charles C. Raley
Coordinator of International Affairs

Center for Building Technology
Institute for Applied Technology
National Bureau of Standards
Washington, D. C. 20234

August 1973

Final



U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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TABLE OF CONTENTS

Introduction	1
Formal Cooperative Programs	2
US/France Cooperative Program	2
Background	2
1972 Summary	5
US/UK Complementary Program	10
Background	10
1972 Summary	11
US/Japan Panel Program	17
Background	17
1972 Summary	19
Proposed US/Switzerland Cooperative Program	20
Background	20
1972 Summary	21
Exchange Programs	23
Special Projects	25
Special Foreign Currency Program	25
Background	25
1972 Summary	27
The United States Agency for International Development (USAID) Program	32
1972 Summary	32
Managua Earthquake Project	34
1972 Summary	34
International Organization Memberships	36
RILEM Activities	36
Background	36
1972 Summary	38
CIB Activities	40
Background	40
1972 Summary	41

USNCCIB Activities	44
Background	44
1972 Summary	46
ISO Activities	48
Background	48
1972 Summary	49
Center for Building Technology Guests	51
Foreign Guest Workers	51
Background	51
1972 Summary	52
Foreign Visitors Summary	53
Center for Building Technology Foreign Travel	59
Center for Building Technology Organization Chart	64

INTRODUCTION

The Center for Building Technology (CBT) supports the view of the National Bureau of Standards (NBS) that domestic scientific research should be coordinated with the expertise of the world community in order to reach desired objectives. The problem of providing man with shelter is one faced throughout the world. Although each country has difficulties peculiar to itself, there exist large areas of common interest. These areas should be discovered, discussed and divided among interested nations in such a way that solutions can be found efficiently and without duplication of effort.

Individual professional ties among staff members of international building organizations form the base of such cooperative efforts. On a second level, various institutions agree to exchange published research information on a regular basis. Eventually it may be desirable to establish formal cooperative or complementary programs in which roles of the participants are clearly defined. At this point division of labor becomes feasible. These three approaches to international cooperation are all vitally important to the Center for Building Technology and are arrangements it would eagerly discuss with other nations.

This is the first issue of an annual publication intended to provide CBT management and foreign research organizations with a summary of CBT international activities.

FORMAL COOPERATIVE PROGRAMS

US/FRANCE COOPERATIVE PROGRAM

Centre Scientifique et Technique du Batiment (CSTB)
4 Avenue du Recteur Poincare
75782 Paris CEDEX 16
FRANCE

Background:

President NIXON of the United States and former President DE GAULLE of France met in Paris during the spring of 1969 to discuss the relationship between their countries. During the course of these talks they expressed the desire to renew scientific and technical cooperation between the countries. As a result of these talks, American Ambassador to France, Mr. Sargent SHRIVER, sent Dr. Edgar L. PIRET (Chief, Scientific Affairs of the US Embassy in Paris) to the United States to explore possibilities of cooperation. The National Bureau of Standards was one of several agencies visited by Dr. PIRET in early April. Dr. PIRET spoke with Dr. James R. WRIGHT, Director, Center for Building Technology (CBT), formerly the Building Research Division. During their conversation it was discovered that both men knew Mr. Gerard BLACHERE, the Director of the Scientific and Technical Building Center (CSTB) in Paris. It became apparent that a cooperative program between CSTB and CBT could be quite beneficial since the scope of the two laboratories was very similar. Dr. WRIGHT subsequently submitted to Dr. PIRET a list of possible areas of interest to CBT.

On May 19, 1969, a meeting was held in Paris with Dr. PIRET, Mr. BLACHERE and Dr. WRIGHT in attendance. Project topics and funding methods were discussed. Then on June 5, a second meeting took place in Washington between Mr. BLACHERE and Dr. WRIGHT, with Mr. Maurice LEVY, Chief of the French Scientific Mission, Washington, in attendance, to outline details for the exchange of two exploratory teams to each other's facilities. The goal of the teams would be to identify potential projects for cooperation, especially those which might provide cost and time savings, to discuss the exchange of guest workers, and to investigate other institutions in the two countries that would be of benefit to the program.

In a joint statement issued on November 25, 1969, by Mr. Francois X. ORTOLI, Minister of Industrial Development and Scientific Research, and Dr. Lee DU BRIDGE, White House Science Advisor, cooperation between France and the United States in several scientific fields, including building technology, was formally initiated.

During the period November 16 through November 29, 1969, the first US Team, headed by Mr. Harry E. THOMPSON, Deputy Director/Operations, CBT, visited France to make an in-depth investigation of the basic topics of the cooperative program. These included: economic appraisal in buildings, assessing the quality of buildings, Agreement System and full-scale testing, advancement of applied building science, industrialized buildings, soils and foundations, and plumbing systems and research. (NBS Report 10-237 provides a detailed account of this visit.)

The reciprocal French Team, under the guidance of Mr. BLACHERE, visited CBT from January 19 until January 30, 1970. Subjects discussed included: mobile homes, urban acoustics, climatology, fire research, economics of single family housing, plastics in buildings, lightweight construction, and performance concept.

At the conclusion of the January visit, a joint recommendation was made by CSTB and CBT to implement the following cooperative projects:

1. Environmental Engineering
2. Durability of Materials
3. Wind Loads on Structures
4. Fire Research
5. Building Acoustics
6. Evaluation of New Building Systems, Components and Materials
7. Plumbing
8. Building Economics.

In addition, it was concurred that regular teams should be exchanged on a yearly or bi-yearly basis, that short- and long-term professional interchanges should be arranged, and that a given volume of French scientific material be translated to English on a regular basis.

Formal letters of agreement were exchanged between Mr. BLACHERE and Dr. Lewis H. BRANSCOMB, then Director of NBS, in June and July 1970.

The second regular US Team visit to France took place between November 9 and November 20, 1970, directed by Mr. W. R. HERRON, former International Coordinator for CBT. In addition to the CBT participants, two Department of Housing and Urban Development officials joined various segments of the visit. Topics discussed included: wind effects on structures, computing heating and cooling loads, determination of convection coefficients, noise transmission through structures, sonic boom, urban noise, aging of materials, soils and foundations, plumbing, structural modeling, evaluation of new building systems, components and materials, and building economics. (Detailed information on the results of this visit is available in NBS Report 10-477.)

In turn, the second regular French Team visited the United States from October 4 through October 15, 1971, headed by Mr. E. FARHI, Chief of the Surfaces Division, CSTB. A staff member of the Experimental Center of Research and Studies for Building and Public Works (CEBTP) joined the group. The subjects of the visit included: roofing materials, building sealants, plastics, rehabilitation of old buildings, Operation BREAKTHROUGH, heating, and concretes and cements.

During the first two years of the Cooperative Program approximately nine additional individual visits were exchanged by the professional staffs of both CSTB and CBT.

1972 Summary:

Mr. BLACHERE and Dr. WRIGHT met in January, May and October of 1972 to discuss the progress of the cooperative effort.

Environmental Engineering:

Important exchanges were generated in the field of thermal engineering. Subjects covered included:

1. Comparison of computations made by CBT (digital) and CSTB (analog) in research work, and the mutual use of experimental data to support these computations. An important facet of this exchange is the evaluation of natural air conditioning using building thermal mass.
2. Climatological data. Discussions are taking place concerning the measure of long wave radiation and diffuse radiation from the sky. In the first case, an apparatus is being developed by CSTB and will be furnished to CBT upon completion.
3. Convection inside rooms. In addition to available information being exchanged, CSTB plans to build an experimental room for further tests.
4. Ventilation. CBT is exploring the ventilation techniques employed by the French Government in low cost housing.
5. Overall design of a prototype apartment building heated by electricity. CSTB is designing and constructing an experimental building using the latest technology. The main thrust of the project is to significantly increase thermal comfort while only slightly increasing energy costs over non-electric alternatives. CBT is interested in studies of investment and consumption costs, and in examining the design in regard to US requirements.
6. Heat pumps. CBT has supplied information on the use of heat pumps to CSTB which in turn is examining their applicability in France.
7. Solar factor standards. The solar factors of heat absorbing glass are being discussed.

8. Air cleaning problems. In conjunction with the development of mechanical air supply in French buildings, CBT has provided CSTB with literature concerning air cleaning problems.
9. Hospital environment. CSTB is studying this subject for the French Health Ministry. The possibility of sending a CSTB engineer to the US for a one year training program at appropriate institutions, with the help of CBT, is being discussed.
10. Thermal performance of a whole building. CBT is studying the performance of family housing while CSTB is concentrating on the all-electric prototype building. The results of comparing predicted to actual performance are being exchanged.
11. Instrumentation of test projects.
12. Physiology. Both CSTB and CBT are interested in the work of Professor Bernard METZ, Director of the Bioclimatic Studies Center in Strasbourg, France. CSTB will assist CBT in their contacts with Professor METZ. Eventually, CSTB and CBT would like to develop a habitability criteria for various comfort conditions, and then ask other laboratories to participate in the program.
13. Air leakage of ducts.
14. Energy conservation. Official documents on this subject have been exchanged by both CSTB and CBT. A heat recovery system developed by CSTB is also being examined.
15. Evaporative air cooling. A simple and inexpensive air cooling system has been conceived by CSTB and is being studied by CBT for application in the US.
16. Room air distribution.
17. Electrical distribution problems. CSTB is putting CBT in touch with the appropriate organization in this area, Electricite de France.

18. Smoke and ventilation.
19. Moisture.
20. Solar energy. CBT has been put in contact with the National Agency for Valuation of Research (ANVAR) by CSTB. ANVAR, which is studying solar heating, has already provided CBT with some of its publications.
21. Tightness of double glazed windows.
22. Mechanical vibration and plumbing noise.

Dr. T. KUSUDA of the Thermal Engineering Systems Section, CBT, spent July 1-9, 1972, at CSTB reviewing existing programs and exploring new areas of mutual interest. The Chief of the Section, Mr. Frank POWELL, made a follow-up visit to CSTB on September 27-30, and the following plans were outlined for 1973 and 1974:

1. Dr. J. HILL of CBT planned to visit France for two weeks during July 1973, under the guidance of CSTB to see various organizations involved in thermal engineering.
2. Mr. REGEF of CSTB will spend two weeks in October 1973, visiting CBT and examining the subjects of heat pumps, air motion, and heat recovery.
3. Messrs. RUBINSTEIN and BOREL from CSTB will visit CBT in the spring of 1974, on the subjects of air cleaning, and the French prototype apartment building respectively.
4. CBT will participate with CSTB in the organization of the Second Symposium on Thermal Engineering Calculations by Computers to be held in June of 1974, in Paris.

Durability of Materials:

Plans were finalized during the French visit of Mr. William C. CULLEN, Assistant Chief of the Structures, Materials and Life Safety Division, CBT, October 12-17, 1972, for a one year stay at the CSTB laboratory outside Paris, by Dr. Walter ROSSITER, a research chemist in the Materials and Composites Section, CBT. Dr. ROSSITER's research will be in the area of durability of building materials and will be carried out under the direction of Mr. E. FARHI, Chief of the Surfaces Division at CSTB. Dr. ROSSITER, after attending French language school at the State Department's Foreign Language Institute, was scheduled to report for duty at CSTB about the first of March, 1973. The use of foamed plastic insulation in roofing will be the main topic studied by Dr. ROSSITER.

Wind Loads on Structures:

Correspondence between CSTB and CBT on the subject of wind loads was initiated in March of 1972. During the year CSTB sent a description of the proposed wind tunnel facility at Nantes. In exchange, detailed information of the wind tests on the CBT building at NBS was sent to CSTB. Dr. Richard MARSHALL of the Structures Section, CBT has been invited to Nantes to see the wind tunnel once it has become operational in mid-1973.

Fire Research:

For two weeks during the period May 22 to June 9, 1972, Mr. Dan GROSS of the Building Fires and Safety Section, CBT, made an investigative visit to the Fire and Radiation Service of CSTB. Of special interest were the full-scale test smoke tower, smoke corridor and burn room. The facilities allow simulation of high-rise fires. Mr. GROSS observed and took part in smoke removal techniques and thereby gained a better understanding of French smoke control regulations for high-rise buildings. CSTB then arranged for a visit to the Fire Test Station at Metz, France.

Building Acoustics:

CBT was having developed and built in 1972, a hybrid analog-digital system apparatus designed for data storage and the determination of the slope and maximum amplitude of noise. Because of delay, it is expected that the apparatus will be finished in September, 1973, and then delivered to CSTB for their use.

Evaluation of New Building Systems, Components and Materials:

CSTB is continuing its analysis of the CBT guide criteria for certain BREAKTHROUGH housing systems against Agreement standards used in France. By the end of 1972, three preliminary reports had been submitted by CSTB. Messrs. BERTHIER and MATHEZ of CSTB made a special trip to three of the BREAKTHROUGH sites and two housing factories between September 10-18, 1972. The results of the trip were used by CSTB in completing their review.

Special Team Visits:

An examination of the application of modern planning, design, and construction techniques to health-care facilities served as the theme for a special US team visit to France headed by Mr. Samuel KRAMER, Chief of the Office of Federal Building

Technology, CBT. Other members of the team came from the Department of Health, Education and Welfare, the Veterans Administration, and the Department of Defense. Between April 17-28, 1972, the US team visited medical facilities in Paris, Dijon, Lyon, and surrounding areas. The team members were afforded the opportunity to interact with representatives of the Ministry of Health, the Central Building Society of the Savings Bank Union (SCIC), and CSTB, the host. Cancer research facilities, retirement homes, teaching hospitals, and educational institutions for the handicapped were also visited. A reciprocal French visit, scheduled for June, 1973, would provide the opportunity for members of the French Government to visit major medical facilities in the US.

Another program was arranged by CBT, on the subject of mobile homes, at the request of CSTB. Three members of the French firm "Dumont et Besson" visited mobile home manufacturing plants near Southbend during June of 1972, escorted by Mr. Henry OMSON of the Mobile Home Manufacturing Association.

Translation:

Publication exchange is also an important aspect of the cooperative program. To date, CBT has translated and published the following French scientific articles:

- "Account of the Principles of Modular Coordination: Industrialization in Building" (NBS 710-1).
- "An Investigation of the Protection of Dwellings from External Noise Through Facade Walls" (NBS 710-2).
- "New Regulation on Ventilation of Dwellings, Fixed Heating Facilities, and Flues" (NBS 710-3).
- "Thermal Comfort Requirement Adjacent to Cold Walls- Application to Glazed Openings" (NBS 710-4).
- "Use of an Air-to-Air Heat Exchanger to Recover Heat from Air Exhausted by Mechanical Ventilation" (NBS 710-5).

An additional four articles are in the process of being translated and published. They should be completed by fall of 1973. The remaining topics include "Ventilation Air Inlets for Dwellings," "Weak Thermal Points or Thermal Bridges," "Rules for Calculating Utilitarian Thermal Characteristics of Structural Panels and Seepage in Building Foundations" (Volumes 2 and 3), and "The Protection of Glazed Windows from Solar Radiation."

US/UK COMPLEMENTARY PROGRAM

Building Research Establishment (BRE)
Garston, Watford, WD2 7JR
UNITED KINGDOM

Background:

On July 21, 1971, a memorandum of understanding was signed by Mr. Peter E. WALKER, Secretary of State, UK Department of the Environment and Mr. George ROMNEY, Secretary of the US Department of Housing and Urban Development. It outlines a program for cooperation in matters concerning the urban environment including housing and building technology. The goal of this program is to achieve the maximum exchange of documents and visits, and can be extended to such other activities as expert consultations, long term exchanges of professionals, and joint research projects. In carrying out this understanding, the two national coordinators may invite participation from other agencies, organizations or private groups within their respective countries.

The Building Research Establishment (BRE) and the Center for Building Technology (CBT), have long been acquainted with each other's work and have had a great deal of interaction. During the March 1971, visit of Dr. F. Karl WILLENBROCK, Director of the Institute for Applied Technology (of which CBT is a part) with Mr. James B. DICK, Director of BRE, the subject of a joint BRE/CBT program was discussed. With the signing of the memorandum of understanding, impetus was given to establishing a formal cooperative program between the two groups. As a result, CBT developed a number of research proposals which later were reduced to three specific projects by Mr. DICK and Dr. James R. WRIGHT, Director of CBT.

1972 Summary:

During the first week of March 1972, Mr. Irwin A. BENJAMIN, Chief of the Building Fires and Safety Section, CBT, visited the Fire Research Station, BRE, in order to discuss a cooperative program on fire detectors.

The following May, three BRE staff members visited CBT. The first visit, May 1-2 and 8-10, 1972, was made by Mr. A. F. E. WISE, Head of the Environmental Design and Engineering Division, BRE; the second on May 10, was Mr. J. G. SUNLEY, Head of the Structures and Building Division, BRE; and the third, May 22-26, 1972, was Dr. S. C. C. BATE, Head of the Structural Engineering Division, BRE. Each examined appropriate areas of CBT with the formulation of cooperative projects in mind. At the conclusion of the meetings, three proposals were drawn up for possible implementation. These were: Wind Loads on Buildings, Design of Water Supply and Drainage Installations in Building, and Fire Detectors in Buildings.

Dr. Richard N. WRIGHT, Deputy Director/Technical, CBT, visited BRE briefly during the first week of July to review various aspects of the pending cooperation. Then, on July 6, 1972, Mr. Harry E. THOMPSON, Deputy Director/Operations, CBT, met with Mr. DICK in England to discuss formal implementation of the three projects under the title of the "Joint Complementary Research Program." This resulted in the preparation of three documents of agreement; the first two on wind and hydraulics were signed by BRE on July 27 and countersigned by CBT on August 3, 1972. The third on fire detection was signed on September 1 and countersigned likewise on September 13, 1972.

Between October 22 and 25, 1972, Mr. William C. CULLEN, Assistant Chief of the Structures, Materials and Life Safety Division, CBT, visited BRE in conjunction with the wind loading and fire detection programs which are being carried out in his area.

Wind Loads on Buildings:

The Building Research Establishment is currently conducting a series of studies at Aylesbury, England. Test structures include several two-story townhouses and a specially constructed

building whose roof pitch and story height can be altered. It is anticipated that new construction will extend in the direction of the prevailing winds, thus providing an opportunity to observe the effects of a changing environment on wind loading. The Center for Building Technology is carrying out studies on two structures; one of the general-purpose laboratory buildings on the Gaithersburg campus, and a duplex housing unit at Malmstrom Air Force Base, Montana. Both of these buildings have a clear exposure to prevailing winds. Studies on a single-family dwelling, also located at MAFB with several buildings located directly upwind, were completed in 1972.

Discussions between the liaison officers directly responsible for conducting the joint project, Dr. R. D. MARSHALL for CBT and Dr. K. J. EATON for BRE, have identified a number of items that will increase the value of the studies in progress and that will avoid unnecessary duplication of effort in future studies. A two-week visit (November 1-14, 1972) to CBT and the MAFB field site by Dr. EATON allowed a first-hand appraisal of the wind research program and associated programs within CBT.

Exchanges of experimental data this past year included mean pressure coefficients, fluctuating pressure coefficients, peak factors, auto- and cross-correlation functions, power spectra, probability density functions and coherence functions. In addition, a uniform method of defining and presenting the data was agreed upon. Full-scale data collected by CBT and BRE will be extremely valuable in preparing future revisions of standards covering the design of structures subjected to wind forces.

Because experimental techniques developed independently at BRE and CBT over the years, interesting differences, and, by the same token, insights exist. Therefore, the exchange of information on the methodology for measuring wind pressure and speed has also been fruitful.

One of the primary reasons for collecting wind pressure data on full-scale structures is to provide a basis for evaluating the accuracy of wind tunnel tests. Proper simulation of atmospheric flows in wind tunnels allows for a systematic

study of pressure distributions on buildings and is, with few exceptions, the only method available for establishing design pressure coefficients. Therefore, both establishments are actively engaged in wind tunnel modeling. CBT has in the past contracted with Colorado State University while wind tunnel studies associated with BRE programs have been conducted in their own facility and at Bristol University. As wind tunnel test results have only recently become available, no comparisons between facilities have been made.

Based on exchanges initiated in the first year of the program and studies currently being carried out by the two establishments, the following items have been identified for future collaboration.

1. Exchanges of data obtained from both full-scale and wind tunnel model studies will continue.
2. Dr. MARSHALL will visit BRE in September, 1973, to discuss details of data analysis programs, current full-scale studies, wind tunnel modeling and instrumentation problems. Of particular interest will be results of BRE research into environmental wind problems created by the construction of tall buildings.
3. Work will be initiated on the instrumentation of tall buildings to measure their response to wind. The electro-optical deflection measuring device recently developed at CBT will be made available for this study. BRE is currently exploring the possibility of making these measurements on the Post Office Tower in London. Dr. Robert A. CRIST, Assistant Chief of the Office of Federal Building Technology, CBT, planned to visit BRE June 4-5, 1973, to discuss the Post Office project.
4. Details of the portable data acquisition system currently being developed for use in the Philippines and along the US Gulf Coast will be made available to BRE. Mobile wind measuring equipment in use at Aylesbury will serve as a model for the build-up of a similar system at CBT.

Design of Water Supply and Drainage Installations in Buildings:

Until recently it has not been possible to predict accurately the performance of unusual or innovative gravity drainage systems. The major issues in drain-waste-vent system design are sizing, spacing, and configuration of drainage and vent piping to handle expected loads without inducing pressure

fluctuations in the system that would upset the water seals in the fixture traps. In a series of studies over the last two decades, researchers at the Building Research Establishment have developed a simple procedure and computer program that are recommended for this purpose. The central thrust of the initial project on hydraulic design of drainage systems, therefore, is to test and compare results on alternative approaches to predicting the performance of drain-waste-vent systems.

BRE has made its methodology and computer programs available to CBT and currently these are under review. CBT and BRE have agreed to a full-scale test on typical townhouse and ten-story plumbing system designs. The townhouse was erected in the CBT Plumbing Research Laboratory and the ten-story system was constructed at Stevens Institute's Building Technology Research Laboratory in a HUD-funded program. Researchers at BRE are interested in obtaining further field data on comparison with predictions obtained using their program. CBT researchers are interested in the potential for application of this approach to US plumbing system designs which differ significantly from those used in the UK.

Initial tests have been completed on selected US water closet designs. BRE has selected five European designs for CBT testing which are being shipped to the US.

Between September 18-21, 1972, Dr. Jack E. SNELL, Assistant Chief of the Building Environment Division, CBT, visited the plumbing laboratory at BRE.

Major activities by both parties to this project involve a natural continuation of efforts undertaken thus far.

1. At CBT these include completion of analysis of BRE computer programs, further testing and reporting of fixture calibration methods, and testing of stack-branch fittings in a representative assembly.
2. CBT looks forward to participation with BRE in further full-scale testing on systems yet to be constructed. It is anticipated that a researcher from BRE will come to CBT for these tests and to observe results of the stack-branch assembly tests. This interchange is important because there are significant issues of instrumentation and experimental method to be resolved and agreed upon.

3. CBT will be field testing a prototype system for collection of plumbing system event and load data in the field. This system design draws heavily from BRE's previous experience in this area. It is expected that BRE will review the performance of this system. The data collected in this study will be used to test and validate analytical models of plumbing system loads being developed independently in the US and UK.
4. Dr. SNELL will make a second trip to BRE in September 1973, to meet with Mr. C. J. D. WEBSTER, the corresponding liaison officer for the project.

Fire Detection in Buildings:

The Center for Building Technology and the Building Research Establishment have similar programs leading toward development of acceptance standards for smoke detectors. The emphasis at CBT is on criteria for the self-contained, residential smoke detector, while the emphasis at BRE is on criteria for smoke detectors in commercial use. The smoke detector program at CBT is of recent origin, while the detector program at the BRE has been in existence for a much longer period of time. As a consequence, the interchange between the two programs during this early phase has been limited to an exchange of information in the form of reports and correspondence relative to the results of experimental work.

Areas of mutual concern include such items as long-term reliability of the detectors, avoidance of false or needless alarms, resistance of the detectors to environmental changes such as pressure, temperature and relative humidity, resistance to corrosion, and vibration, and other deleterious effects. Exchange of experimental data in these areas can be expected to increase as additional laboratory work is conducted by both CBT and BRE.

One problem besetting smoke detectors is that certain environmental ambient conditions tend to produce false alarms. Given some knowledge of what ambient conditions can be expected in typical environments, it should be possible to develop criteria for an acceptable lower response limit for detectors to these ambient conditions. BRE is developing an ambient-conditions monitoring system which will assist in determining these lower limits. CBT has been in contact with BRE with a view toward purchasing one or more of these systems for use in the US. BRE has agreed to reduce the data generated by CBT on the subject and process it through BRE's computer analysis program.

Based on exchanges initiated in the early part of this complementary program and research work being carried out by the two organizations, the following items have been identified for future collaboration:

1. Exchange visits by BRE and CBT personnel will take place including a meeting between Mr. BENJAMIN and Mr. Peter E. BURRY, BRE, the two liaison officers for the project, in February 1973.
2. Exchanges of information will be made on development of full-scale and laboratory-scale testing procedures for smoke detectors.
3. Exchanges of data on reliability of presently-available smoke detectors will be made.
4. CBT will purchase a BRE ambient-condition monitoring system with data reduction and processing by BRE after US data has been obtained.
5. Details of CBT studies on smoke movement in typical residences will be made available to BRE as the work proceeds. It is anticipated that the results of the smoke movement studies will have some applicability to commercial and industrial occupancies and will, therefore, be of interest to BRE.

US/JAPAN PANEL PROGRAM

US/Japan Panel on Wind and Seismic Effects
Public Works Research Institute
Ministry of Construction
2-28-32 Honkomagome, Bunkyo-ku
Tokyo
JAPAN

Background:

The United States/Japan Cooperative Program In Natural Resources (UJNR) was established in 1964 when the US/Japan Cabinet-level Committee on Trade and Economic Affairs agreed that exchanges of information, specialists, technical data, and research equipment in the field of natural resources would be highly beneficial to both countries. The objective of the program is to learn as much as possible from each other so that future generations will have a better environment. The program includes a wide variety of subjects including a special Panel on Wind and Seismic Effects.

The Japanese and US Governments have primary responsibility for program planning, organization, and control; however, non-governmental organizations and individuals often participate in program activities by invitation as consultants or advisors at various symposia. Results of the cooperative work are disseminated widely through professional journals, press releases, speeches, and other media.

The present system of direct communications between counterparts is very useful. In addition to exchanging information and conducting study missions, panels are encouraged to use various other ways for accomplishing exchanges and cooperation, such as joint or complementary research exchanges of personnel for extended periods, exchanges of equipment and experimental materials, and use of joint conferences and symposia. All of these benefit domestic programs of both countries.

The US Panel on Wind and Seismic Effects consists of twelve members, three consultants, and three alternates. US agencies represented are the National Bureau of Standards (Center for Building Technology), National Ocean Survey, Bureau of Reclamation, National Science Foundation, US Geological Survey, Veterans Administration, Federal Highway Administration,

Environmental Data Service, Department of Housing and Urban Development, Office of the Chief of Engineers, and the US Naval Civil Engineering Laboratory. In addition, the State of California is represented on the Panel by a consultant. The Japan Panel consists of sixteen members representing the Public Works Research Institute, Building Research Institute, Meteorological Research Institute, Port and Harbor Research Institute, and the National Research Center for Disaster Prevention. The Chairman of the US Panel is Dr. Edward O. PFRANG, Chief of the Structures, Materials and Life Safety Division, CBT, and that of the Japan Panel is Mr. Mitsuru NAGAO, Director of the Public Works Research Institute.

In addition to informal exchanges of information, a number of documents have been exchanged directly by counterpart members. These have included recommendations for the repair of structures damaged in the Santa Rosa, California, Earthquake, foundation design criteria for the Fort St. Vrain Nuclear Power Plant and strong motion acceleration records.

An excellent example of the continuing exchanges between the US and Japan concerns the recent earthquake in California's San Fernando Valley. A Japanese team of experts, accompanied by US Panel members, spent several days in the area investigating structural damage. Findings by both sides were the subject of a one-day seminar sponsored by the Science Council of Japan and held in conjunction with the Third Joint Meeting in Tokyo. Lessons learned from the Lubbock Tornado and Harricane Celia were also discussed.

1972 Summary:

The Fourth US/Japan Panel Meeting was held in the United States from May 13, to May 25, 1972. The meeting included a three day technical session (May 17-19) at the National Bureau of Standards, and field trips to research laboratories and construction sites.

Themes discussed at the Fourth Joint Meeting included the following:

1. Estimation of Extreme Winds for Structural Design.
2. Response of Full-Scale Structures to Wind Action.
3. Strong Ground Motions Due to Local Earthquakes.
4. Dynamic Behavior of Structures and Subsoil During Earthquakes.
5. Rehabilitation of Structures Damaged by Earthquakes.
6. Related Topics on Technological Information in Developing Countries (Peruvian Earthquake of 1970 and Typhoon Yoling in the Greater Manila Area in 1970).

The mitigation and prevention of damage due to natural disasters was identified as a topic of great importance at this meeting and will be discussed in some detail at the Fifth Joint Meeting which is to be held in Tokyo in the spring of 1973. It was also agreed that methods of assessing the vulnerability to damage of existing buildings and structures by severe storms and earthquakes will be a topic for future exchanges. Both panels felt that the design and site planning of structures and communities which normally receive only cursory engineering analyses for wind and seismic effects is a pressing problem, and that significant economic and social benefits could come from its solution.

PROPOSED US/SWITZERLAND COOPERATIVE PROGRAM

Forschungskommission Wohnungsbau (FKW)
Effingerstrasse 20
3003 Bern
SWITZERLAND

Background:

On May 20, 1970, Dr. Charles TAVEL, former Scientific Counselor, and Dr. Georges-A. GRIN, present Scientific Counselor, Embassy of Switzerland, visited the Center for Building Technology (CBT). Three weeks later on June 12, 1970, Dr. James R. WRIGHT, Director of CBT, attended a special meeting with Drs. TAVEL and GRIN on the subject of a collaborative program in building technology. It was decided that a potentially successful basis for such a program existed and therefore that Dr. WRIGHT should visit Switzerland that September.

Contact in Switzerland was made, on September 9 and 10, 1970, with the officials of seven major building oriented institutions. The results of the visit indicated that the Swiss are highly interested in US research programs based on hard science and engineering. In turn, the Swiss have very effective programs underway in the soft sciences area, such as human needs, space utilization, and building economics, which would be of great interest to American building technology. Second, it was felt that any cooperative program should be based on an informal understanding between the participating institutions, rather than a formal agreement between the two governments. Finally, it was found that Professor Jean W. HUBER, Director of Federal Construction and President of the Federal Research Commission for Construction (FKW) should be the Swiss focal point for such a program.

As a result of a meeting on November 11, 1971, between Dr. GRIN and Mr. Nelson F. SIEVERING, State Department Science Office, a memorandum for the record was developed by the Swiss Embassy on December 8, 1971 recommending the initiation of the project in line with the points mentioned above.

1972 Summary:

The following July, Professor HUBER met Mr. Harry E. THOMPSON, Deputy Director/Operations, CBT, at the CIB meeting in Hannover, Germany. The subject was brought up of sending a CBT staff member to Switzerland for two weeks in order to become acquainted with local building technology. In his letter of September 22, 1972, Dr. WRIGHT informed Professor HUBER that Mr. Heinz R. TRECHSEL, a CBT Research Architect, had been chosen for the trip.

Accordingly, Mr. TRECHSEL visited Switzerland from November 17 through December 4, 1972, to meet with various organizations and individuals to assemble information and data on building and housing research activities. The program for the visit was developed by Professor HUBER, and included 22 organizations and individuals active in research, planning, education, design, production, testing, and in the building regulatory field. Although the primary objective of the visit was to survey the present building research activities and organizations, Mr. TRECHSEL found that these could be viewed in the proper context by a brief review of building and housing construction in general.

The organizations visited and persons interviewed were all principally active or interested in the software aspects of housing design, planning, and construction. Since CBT has interests also in the hardware aspects and in building research other than housing, the information gained during the visits was supplemented by studying the literature collected. Within the limitations of a two week visit, a good understanding was gained of the country's building research activity.

Switzerland is very active in building research. This activity appears to be considered a vital and integral part of the total effort to improve the housing situation. The activity also appears well coordinated and directed by FKW.

The single research projects are conducted by private, educational, and non-profit organizations under federal contract to FKW. The projects concern mainly the software aspects of socio-economic housing research areas. Substantial research is reported in the civil engineering areas, but such research is not considered part of housing research. While both housing related software, and engineering hardware research is well developed, it appears that the one aspect that is underdeveloped in Swiss building research is the interdisciplinary link between the two areas.

With regard to a possible cooperative program between CBT and appropriate Swiss institutions, it appears that both countries would profit from work in the areas of both socio-economic software and engineering hardware. Mr. TRECHSEL was also assured by his Swiss hosts of their great interest in establishing an active cooperative program between the building research organizations of Switzerland and the US.

In order to gain a similar familiarity with building technology in America, Professor HUBER is planning an exploratory visit in 1973.

(A highly detailed report, titled Swiss Building and Housing Research Activities, March 1, 1973, discussing building, research, regulatory and educational activities, building research organizations, and building research projects, has been assembled by Mr. TRECHSEL).

EXCHANGE PROGRAMS

In addition to the cooperative programs outlined above, the Center for Building Technology (CBT) maintains very close ties with the following parallel organizations through exchange of information and, when appropriate, exchange of professional visits.

Division of Building Research
CSIRO
P. O. Box 56
Highett, Victoria 3190
AUSTRALIA

Division of Building Research
National Research Council of Canada
Montreal Road
Ottawa K1A 0R6
CANADA

A high degree of interaction has naturally existed between the National Research Council (NRC) and CBT. Three NRC staff members visited CBT on the subject of fire research in 1972. In turn, five CBT professionals visited NRC on such topics as thermal studies, wind loads, plastic pipe, and structural engineering.

Danish Building Research Institute
20 Borgergade
1300 Copenhagen K,
DENMARK

Building and Road Research Institute
CSIR
University P. O. Box 40
Kumasi
GHANA

Central Building Research Institute
CSIR
Poorkee (U.P.)
INDIA

While information has long been exchanged, discussions are under way for developing a formal cooperative program. The Institute is also involved in three Special Foreign Currency Program projects described in a separate section of this report.

Building Research Institute
Ministry of Construction
4-Chome, Hyakunin-Cho, Shinjuku-Ku
Tokyo
JAPAN

The Institute is considering sending one of its professionals to CBT as a guest worker in the area of fire protection, in 1973. One of CBT's staff visited the laboratories of the Institute in conjunction with thermal studies in 1972.

· Building Research Association of New Zealand
P. O. Box 9375
Wellington 1
NEW ZEALAND

Norwegian Building Research Institute
P. O. Box 322, Blindern
Oslo 3
NORWAY

Three officials from the Institute visited CBT on the subject of Operation BREAKTHROUGH in April 1972. The following July, Mr. H. E. THOMPSON, Deputy Director/Operations, CBT, spent several days examining the Institute's facilities.

National Building Research Institute
CSIR
P. O. Box 395
Pretoria
SOUTH AFRICA

During May 1972, Dr. T. L. WEBB, Director of the Institute, visited CBT to discuss various aspects of research information exchange. One of his staff members also visited CBT several months later on the subject of information dissemination.

Svensk Byggtjänst
P. O. Box 1403
111 84 Stockholm
SWEDEN

SPECIAL PROJECTS

SPECIAL FOREIGN CURRENCY PROGRAM

Background:

The United States Government acquires foreign currencies in the course of its overseas operations. These and other foreign currencies are kept in Treasury Department accounts and are available to some Government agencies to finance overseas activities. Excess foreign currencies are the US-owned currencies of the countries in which the Treasury Department has found the supply to be greater than required for normal US demands for the next two or three years. The Treasury Department designates foreign countries for which currency supply exceeds demand as "excess foreign currency countries." Congress makes a separate appropriation to NBS for the purchase of excess foreign currencies. This appropriation is supplementary to, not a substitute for, the regular NBS appropriation. The official appropriation title is Research and Technical Services, Special Foreign Currency Program (SFCP). (This program is also referred to as the PL-480 Program.)

Since Fiscal Year 1961, the National Bureau of Standards has had an active Special Foreign Currency Program in India, Israel and Pakistan. During 1970, Yugoslavia was added to the list of countries; Poland and the United Arab Republic (Egypt) in 1972.

SFCP grants provide an appropriate means for accomplishing NBS objectives, consistent with US foreign policy. NBS criteria for this purpose are:

1. All projects must be of scientific or technological excellence.
2. All projects must be within the mainstream of NBS interests or contribute directly to NBS effectiveness.
3. All projects must benefit both the US and the participating countries. SFCP funds must not merely replace otherwise available country funds; and individuals or institutions abroad must not become primarily dependent upon NBS for long term support.

4. All projects must be followed closely by NBS staff members working in related areas. Thus, one or more NBS staff should maintain a continuing direct relationship with the foreign person or group. This relationship should be strengthened by visits in both directions.
5. NBS involvement with a technical institution of another nation should be consistent with US foreign policy.
6. NBS staff travel to participating foreign countries should be exploited, when practical, by suitable additional itinerary to identify additional targets for bilateral benefit or to provide additional strength to existing relationships. Such travel should be coordinated with the SFCP Manager, Mr. H. Steffen PEISER, Chief of the Office of International Relations, NBS.

1972 Summary:

The Center for Building Technology (CBT) has entered into twelve SFCP projects since January 1, 1966. Although the basis for implementation of such arrangements is constantly changing because of the nature of the program, CBT is interested in discussing possible building oriented projects with appropriate institutions in qualifying countries. The existing CBT grants are outlined below.

Grant 91 - Title: Composite Structural Systems in Buildings

Scope: A comprehensive review of the state-of-the-art will be made of all aspects of structural behavior, fire proofing, elastic and inelastic behavior, shrinkage, temperature and fatigue considerations for composite structural systems. Experimental and analytical studies will be made of in-filled frame models, masonry walls on beams, encased beams in columns, and in-filled tubes, with tests being made on actual prototypes up to failure. Measurements of strains, deformations and stresses would be made using strain gages and dial gages. The experimental investigations would involve development of new measurement techniques and test procedures. The analytical studies on in-filled frames subjected to lateral loads or to the interaction between frames and shear walls of masonry, including the interaction with floors, would be attacked, using discrete analytical models for continuous systems and also using numerical techniques.

Principal Investigator: Professor J. K. S. RAO
Institute: Indian Institute of Technology, Kanpur, INDIA
CBT Monitor: Dr. F. YOKEL, Structures Section, CBT
Funding: \$31,000
Signed: November 7, 1968
Expired: November 7, 1972
Note: Cost Extension Requested.

Grant 98 - Title: Sanitary Plumbing Drainage for High-Rise Buildings Without Vent Systems

Scope: Investigate performance and economics of sanitary drainage system for high-rise buildings employing unconventional measures such as special fittings or oversized soil and waste stacks intended to maintain acceptable hydraulic and pneumatic performance without the use of conventional system of vent piping.

Principal Investigator: Professor D. MOHAN
Institute: Central Building Research Institute,
CSIR, Roorkee, INDIA
CBT Monitor: Mr. R. S. WYLY, Building Services Systems
Section, CBT
Funding: \$76,000
Duration: Three years
Note: Final Approval Pending

Grant 99 - Title: Study of Structural Elements Under
Dynamic Loading.

Scope: The research will be directed toward an experimental and theoretical investigation of the effects of blast loads on structural elements and structural models. The experimental study will be directed toward the development of methods of stress and strain measurement in elements under dynamic loading conditions such as those resulting from accidental explosions such as cooking gas. The ultimate aim of the research is to develop criteria which can be used for the performance evaluation of building systems. It is expected that definite recommendations suitable for code implementation will result from the investigation.

Principal Investigator: Professor V. SUNDARARAJAN
Institute: Indian Institute of Technology, Kanpur, INDIA
CBT Monitor: Dr. F. YOKEL, Structures Section, CBT
Funding: \$16,500
Signed: July 25, 1970
Expires: January 24, 1974

Grant 100 - Title: Water Conservation Measures in Plumbing

Scope: The aim of this project is to determine performance of sanitary plumbing equipment or systems designed to reduce water consumption through measures such as high-efficiency sanitary fixtures and flow regulating devices. It is intended also to carry out observations and tests on recirculating sanitary waste-disposal systems and on the "Vacuum Sewerage System" in order to ascertain whether efficient oxidation of organic waste products is feasible with small consumption of water.

Principal Investigator: Professor H. ILBERG
Institute: Standards Institution of Israel, Tel Aviv,
ISRAEL
CBT Monitor: Mr. R. S. WYLY, Building Services Systems
Section, CBT
Funding: \$57,000
Signed: March 24, 1970
Expires: March 24, 1974

Grant 101 - Title: The Reinforcement of Concrete by Polymers

Scope: A new family of materials consists of ordinary concrete impregnated after hardening with a monomer which is then polymerized by radiation. In some cases the results obtained, in terms of mechanical, physical and chemical properties, are very striking. It will be the object of this investigation to study the interaction of the two component materials and to develop an understanding of the mechanism by which the polymer reinforces the concrete as a basis of a more rational design of the composite system.

Principal Investigator: Professor J. GLUCKLICH
Institute: Israel Institute of Technology, Haifa, ISRAEL
CBT Monitor: Mr. T. REICHARD, Structures Section, CBT
Funding: \$34,000
Signed: November 8, 1970
Expires: November 2, 1973

Grant 109 - Title: New Developments, Directions and Innovations in Buildings and Building Research

Scope: A factual exposition and up-to-date technical and economical evaluation of Israeli experience and research is to be given for building activity. The applicability of improvements and innovations of the construction methods in Israel to the building industry in the US will be considered.

Principal Investigator: Mr. A. ALWEYL
Institute: Standards Institution of Israel, Tel Aviv, ISRAEL
CBT Monitor: Mr. P. R. ACHENBACH, Building Environment Division, CBT
Funding: \$12,000
Signed: March 17, 1970
Expired: March 16, 1972
Note: Cost Extension Requested

Grant 120 - Title: Improvement of the Strength of Bonded Joints by Mechanical Surface Activation of the Adherends

Scope: Vigorous abrasion of the adherends is the usual method used to improve the strength of bonded joints. However, the free valency sites thus created are quickly inactivated by O_3 , O_2 , H_2O , N_2 and CO_2 . It is proposed to activate the

surfaces mechanically in the presence of suitable reactive adhesives, with a view to making newly created reactive sites immediately available for strong adhesive bonds. Apart from mechanical testing of the adhesive strength of the bonds thus obtained, the degree of chemical activation will be measured directly with the aid of suitable tracer elements such as $^{18}O_2$.

Principal Investigator: Dr. C. H. LERCHENTHAL
Institute: Israel Institute of Technology, Haifa, ISRAEL
CBT Monitor: Mr. A. HOCKMAN, Materials and Composites Section, CBT
Funding: \$12,000
Signed: September 29, 1970
Expired: September 28, 1971
Note: Awaiting Final Report

Grant 121 - Title: Development of Tensile Strength, Tensile Strain, and Stress in Fresh Concrete Exposed to High Evaporation

Scope: Previous studies of the plastic shrinkage of concrete showed that the paramount influence on the relation between the tensile stress and tensile strength on plastic cracking was caused by evaporation of water from the fresh concrete. Studies of length change measurements, rheological properties, tensile stress, tensile strength, and rate of evaporation of varied mixes exposed to different climatic conditions will be conducted for a period of ten hours after casting. It is hoped that the findings will lead to improved recommendations for concrete design in hot dry weather.

Principal Investigator: Professor R. SHALON
Institute: Israel Institute of Technology, Haifa, ISRAEL
CBT Monitor: Mr. T. REICHARD, Structures Section, CBT
Funding: \$14,000
Signed: August 12, 1970
Expires: October 1, 1973

Grant 143 - Title: Prediction of the Thermal Behavior of Full-Scale Buildings

Scope: To compare and validate several mathematical methods for the prediction of the thermal behavior of buildings, i.e., the pattern of their indoor air temperatures as a function of their design, their construction and of the variations in the outdoor climatic conditions. The Response

Factor according to the ASHRAE procedure and the total thermal time constant methods, will receive particular analysis.

Principal Investigator: Dr. B. GIVONI
Institute: Israel Institute of Technology, Haifa, ISRAEL
CBT Monitor: Dr. T. KUSUDA, Thermal Engineering Systems
Section, CBT
Funding: \$14,000
Signed: July 16, 1971
Expires: July 15, 1973
Note: Awaiting Final Report

Poland SFCP Trip:

Between January 3 and January 13, 1972, Mr. William R. HERRON, former coordinator of International Affairs, CBT, accompanied an NBS multidisciplinary team to investigate possibilities for cooperative research projects under SFCP funding in Poland. Mr. HERRON visited approximately seven organizations, including the Institute for Building Technology, and the Committee for Science and Technology which formulates all scientific research in Poland. In addition, a visit to a new town took place. A final meeting with Dr. Marian DABROWSKI, Scientific Counsellor to the Ministry of Construction and Building Materials Industry, was held on the subject of possible SFCP projects with CBT. Dr. DABROWSKI planned to visit CBT at the beginning of 1973 to further discuss the matter.

THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
(USAID) PROGRAM

1972 Summary:

The Center for Building Technology (CBT) is supporting USAID by helping refine low-cost housing and community building designs and construction techniques to better withstand windstorms and earthquakes in developing countries. CBT provided USAID with engineering support and technical assistance for two projects in calendar year 1972.

The first, "Design, Siting and Construction of Low-Cost Housing and Community Buildings to Better Withstand Earthquake and Windstorms," was concerned with analyzing the potentials of housing technology for mitigating earthquake and windstorm disasters in developing countries. Within this context this study centered around four principal tasks, each common to a representative sample of worldwide developing countries. These tasks consisted of performing a state-of-the-art study of selected developing country's housing technology, evaluating their socio-economic and cultural constraints, and identifying their building construction related data gaps. Also, an evaluation of proposed alternative approaches to improved building design, material usage and construction techniques including approaches to overcome technological and socio-economic barriers against more effective building practices was performed.

Four representative countries were selected for this study. They were Peru, Turkey, Iran and the Philippines. These developing countries favorably represented worldwide geographic areas that suffer frequent devastation from earthquakes and extreme winds. Visits were made to these countries by CBT personnel to collect data both through interviews and on-site observations. Reports from contracted local individuals with established expertise in their country's housing and climatological conditions were reviewed and analyzed by CBT project staff. Information from both personal visits and the indigenous individual reports provided the basis for analysis and the forthcoming recommendations. The final report will be released to USAID in the fall on 1973.

The second project, "Locally Planned Windstorm and Earthquake Resistant Structures," focused on developing improved seismic-resistant buildings in Peru using oil-stabilized and cane-reinforced adobe block construction. This study is being performed in collaboration with Peruvian housing authorities and educational institutions in the US and Peru. CBT is providing technical support in developing procedures for seismic design and construction of adobe housing units and testing specifications for adobe structural elements and improved and innovative light weight roofing systems. Also, CBT is providing technical assistance on an as-needed basis to the Peruvian Government.

On several occasions representatives from CBT visited Peru to inspect earthquake-affected regions, to coordinate the research and become familiarized with Peru's traditional construction and testing practices, to conduct disaster investigations of structural damages inflicted by the 1970 earthquake, and to perform an assessment of future experimental needs to develop the basis for seismic design criteria for reinforced adobe dwellings.

A series of on-site reports will be submitted to USAID/Peru in late 1973. These reports will assist the local USAID mission to identify and weigh the many factors that will result in benefits and costs to potential urban and rural, new and renewal dwellings and their residents.

In March 1973, a third USAID sponsored project entitled, "Design Criteria and Methodology for Construction of Low-Cost Housing to Resist Typhoons and Hurricanes," was scheduled to be undertaken by CBT.

MANAGUA EARTHQUAKE PROJECT

1972 Summary:

The emphasis of the investigation conducted by the Center for Building Technology (CBT) team following the Managua, Nicaragua, earthquake of December 23, 1972, was to assist Nicaraguan authorities in evaluating the conditions of public buildings immediately following the disaster, and to observe causes of building failures for guidance toward improvements of earthquake resistant practices for design, construction and use of buildings.

The National Bureau of Standards was informed of the earthquake on December 23, 1972, by the warning service of the National Oceanic and Atmospheric Administration (NOAA). The situation was reviewed with Dr. Nathan M. NEWMARK of the National Academy of Engineering who indicated that the event could be of substantial technical interest and that the Academy was sending Dr. Mete SOZEN of the University of Illinois to investigate the earthquake. Mr. Samuel KRAMER, Chief of the Office of Federal Building Technology, CBT, arranged for State Department authorization to investigate the disaster and the entrance of himself, Dr. Richard N. WRIGHT, Deputy Director/Technical, CBT, and Dr. Mete SOZEN as a combined team. At the same time arrangements were made for entrance of a team of seismologists from NOAA.

The team was warmly received on December 26, 1972 by the Nicaraguan authorities and given a preliminary tour of the city. The following day, the team continued informal investigations of the damage with the assistance of helicopter transportation loaned by General SOMOZA and ground vehicle transportation provided by Nicaraguan police. Liaisons were established with the Nicaraguan Ministry of Public Works for coordinated efforts in investigations of building damage.

On December 28, 1972, the CBT team plus Mr. Karl STEINBRUGGE, a consulting structural engineer with the NOAA seismological team, were granted a pass for conducting investigations of

building damage and began examinations in conjunction with staff members of the Department of Construction and Maintenance of Public Buildings of the Ministry of Public Works. Dr. Abdel KARIM, Head of the Civil Engineering Department at the University of Nicaragua, also worked closely with the team during its studies. These investigations continued until January 4, 1973, when the team returned to the United States.

Two follow-up trips to Nicaragua (June and July, 1973) were planned by Dr. Richard N. WRIGHT, the first to participate in the "Technical Seminar on the Reconstruction of Managua" sponsored by the Domestic and International Business Administration, US Department of Commerce, and the private sector of Managua, and the second, to furnish technical services, in accordance with an agreement with the US Agency for International Development, on a joint team with the Organization of American States, to review and evaluate activities related to the development of a building code for Nicaragua and the establishment of a building regulatory system, institute for building standards, and a laboratory for testing building materials.

INTERNATIONAL ORGANIZATION MEMBERSHIPS

RILEM ACTIVITIES

Reunion Internationale des Laboratoires d'Essais
et de Recherches sur les Materiaux
et les Constructions (RILEM)
12 Rue Brancion
75737 Paris CEDEX 15
FRANCE

Background:

The International Union of Testing and Research Laboratories for Materials and Structures (RILEM) had its origin in 1947 at a meeting in Paris of a small number of laboratory directors and researchers who were anxious to re-establish the international relations broken off by the war on a new basis. In a devastated world in which construction assumed the urgent character of reconstruction, in which scientific and technical progress was undergoing a bewildering acceleration, the need to break out of an enforced isolation and to resume contacts which had been interrupted for six years had become a necessity.

RILEM is an international non-profit association governed by Swiss law. Its purpose is to facilitate contacts and scientific information among its members and its aim is to constitute a medium of exchange and of communication of experience, essentially the experience acquired by the study of materials and building elements, by the observation of works, by tests in the laboratory and in situ, and by research without which none of these activities could progress. The 1972 RILEM membership list shows representatives from seventy-eight nations.

RILEM's activities are concerned with:

- Research on the properties of construction materials, their evolution and the changes they undergo through time when subjected to internal and external agents, and the performance of structures. Mindful of recent developments in the science of materials, RILEM concerns itself increasingly with:

basic research on the structure and properties of materials; relations between the structure and the properties of materials; basic research on the durability of materials; and, the synthesis of the above activities with a view to encouraging the production and the rational use of building materials.

- The definition of materials testing methods and of the measurement of their characteristics, before and after their placing, as well as of methods for the testing and observation of structures (mechanical properties, deformations, stability, behavior in time, etc.); their improvement and their unification in order to arrive at common testing methods, if possible standardized, which will furnish comparable results on an international scale.
- The equipment and the organization of testing laboratories, in particular the improvement of measuring apparatus and testing machines.
- The organization of information for research, without going into the organization of research.

RILEM fulfills its function of disseminating information and promoting exchange by its publication, its surveys and its symposia; it pursues its undertaking of improvement and unification of testing methods by means of its technical committees.

In all, there are approximately twenty-three technical committees covering the spectrum of construction research. Each committee has the task of producing recommendations which will eventually be transmitted to the International Organization for Standardization (ISO), the only body authorized to promulgate international standards.

Since 1954, RILEM has organized thirty-eight international symposia, on a wide variety of subjects, at the conclusion of which complete reports on the proceedings have been published.

1972 Summary:

In connection with his position as President of RILEM, the 26th meeting of the Permanent Committee took place in Washington between April 24 and April 30, 1972, at the invitation of Dr. James R. WRIGHT, Director of the Center for Building Technology (CBT). Delegates from Argentina, Brazil, Bulgaria, Canada, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Netherlands, Norway, South Africa, Spain, Sweden, Switzerland, United and USSR attended.

The present state of the twenty-three technical committees was reviewed in the Coordinating Group's report, and various proposals for additions and modifications were made. Then, several symposium projects were examined. Before adjourning, the Permanent Committee elected its new President, Professor Dimitar VATCHEV, Director of the Institute of Building Sciences (NISI), Sofia, and Delegate for Bulgaria. Professor VATCHEV invited the Permanent Committee to meet in Bulgaria from September 24 to October 1, 1973.

The Washington meeting was followed by the joint RILEM/ASTM/CIB Symposium, the "Performance Concept in Buildings," May 3-5, 1972. Assistant Secretary for Research and Technology, US Department of Housing and Urban Development, Harold FINGER, stressed the need for worldwide cooperation in furthering the performance approach in test methods in regard to acceptance standards. Nearly two hundred participants from twenty-five countries listened to eighty-two papers on the subject. In summing up the proceedings, Neil B. HUTCHEON, Director of the Division of Building Research, National Research Council of Canada, termed the symposium one of the most significant ever held to consider building and building construction, and he continued by saying that the papers, reports and discussions constituted a formidable body of materials which will only be fully exploited over many months and years to come. (The proceedings of the symposium have been published in two volumes, NBS Special Publications 361-1 and 361-2.)

In addition to Dr. WRIGHT's role as US Delegate to RILEM, two other CBT staff members serve in official capacities. Dr. Richard N. WRIGHT, Deputy Director/Technical, CBT, serves as the RILEM representative to the ASCE/AIPC Committee for Tall Buildings. And second, Technical Committee 27-EVS, "Evaluation of External Vertical Surfaces of Buildings," is under the chairmanship of Mr. William C. CULLEN, Assistant Chief of the Structures, Materials and Life Safety Division, CBT.

During 1972, the possibility of creating a RILEM North American Group, modeled after various European national groups and the Latin American Group, was discussed. A questionnaire distributed by Dr. WRIGHT to the approximately thirty-four Canadian and US members of RILEM in January, received a generally favorable response to the idea. A special meeting took place on May 2, 1972, in Philadelphia to further discuss the matter. Although the difficulties in establishing the group were apparent, reaction indicated that such a focal point was a necessity. Further consideration is being given the subject and a tentative second meeting was planned for 1973.

Finally, in his capacity as a member of the RILEM Bureau, Dr. WRIGHT met with that policy making group on January 27 and October 13, 1972, in Paris and in April during the Permanent Committee Meeting in Washington.

CIB ACTIVITIES

Conseil International du Batiment pour la Recherche
l'Etude et la Documentation (CIB)
Postbus 229, Weena 700
Rotterdam
NETHERLANDS

Background:

The International Council for Building Research, Studies, and Documentation (CIB) was established in 1953 in response to recommendations made by the United Nations Economic Commission for Europe. CIB's major objective is to encourage and stimulate international cooperation in the gathering, refinement, and dissemination of building research information. These mutual exchanges facilitate the development and adoption of building standardization practices which provide for the effective exchange of building research data and interchangeability of products on the international level.

Forty-five countries are currently members of CIB and send delegates from building-oriented organizations to participate in various CIB activities. Each full member country appoints a representative to the CIB General Assembly which meets at least once every three years and in which the authority of CIB is vested. The US National Committee for CIB is the sole representative of US interests.

1972 Summary:

The following CIB committees were represented by Center for Building Technology (CBT) staff members as outlined below.

W-23A: Safety of Load-Bearing Walls

Development of scientific bases for building codes, especially regarding calculations and testing of stresses in load-bearing walls.

Dr. N. F. SOMES, Chief, Structures Section, CBT.

W-24 : Dimensional and Modular Coordination (International Modular Group (IMG)).

Establishment of rules for dimensional coordination of construction components and products and recommendations for their use.

Mr. C. T. MAHAFFEY, Office of Building Standards and Codes Services, CBT.

W-40 : Heat and Moisture Transfer in Materials and Structures.

Study of hygro-thermics, the basic phenomena of moisture and heat transfer in materials and structures.

Mr. F. J. POWELL, Chief, Thermal Engineering Systems Section, CBT.

Mr. POWELL delivered an informal paper to the W-40 Committee which met in Holzkirchen, Germany between September 19 and September 24, 1972.

S-41 : Tall Buildings:

Organization of symposia on architecture, construction, engineering, and user's needs in relation to buildings over twenty stories.

Dr. F. Y. YOKEL, Structures Section, CBT.

S-47 : Information Flow in the Building Process.

Organization of symposia on the application of theories of information, classification, and coding as guides in the building process.

Mr. J. L. HAECKER, Chief, Scientific and Professional Liaison Section, CBT.

On May 16, 1972, a North American Roundtable on the subject of "Economic Considerations of Construction Information," organized jointly by Mr. HAECKER, CBT, and Mr. Brian HOLMES of the Canadian Department of Industry, Trade and Commerce, was held at the National Bureau of Standards at the request of CIB/S-47. The objectives of the roundtable were to identify North American problems of building construction information and their related costs, and the trends and targets of opportunity in information handling. Twelve persons from Canada and the US took part in this meeting.

W-52 : Exchange and Dissemination of Information for Practitioners.

Analysis of users' needs and procedures for unifying literature abstracts and applying keywords and thesauri internationally for electronic data processing.

Mr. J. L. HAECKER, Chief, Scientific and Professional Liaison Section, CBT.

W-60 : Performance Concept in Building.

Development of a conceptual framework for a performance approach to building as well as a terminology and a commentary on the existing situation.

Dr. R. WEHRLI, Chief, Architectural Research Section, CBT.

Dr. WEHRLI met informally with W-60 members at CSTB and BRE in September of 1972.

W-62 : Water Supply and Drainage in Buildings.

Research to develop standards for water supply and drainage facilities in buildings.

Dr. J. E. SNELL, Assistant Chief, Building Environment Division, CBT.

Dr. SNELL attended the first meeting of the newly formed W-62 Committee on September 21, 1972, at the Building Research Establishment, UK. It was found that European experience could be quite useful in updating US plumbing design practices.

CBT staff who took part in CIB activities as guests rather than committee members are the following. Mr. D. GROSS, Building Fires and Safety Section, participated in the Tenth Meeting of W-14 (Fire), in Stockholm, Sweden, May 13-22, 1972. Mr. F. J. POWELL, Chief, Thermal Engineering Systems Section, presented a paper "Air Conditioning Criteria of Human Comfort," and participated at the W-45 (Human Requirements and Building Design) Symposium held at the Building Research Establishment, UK, September 11-19, 1972. Mr. H. E. THOMPSON, Deputy Director/Operations, attended a special meeting of S-47 (Information Flow in the Building Process) for Mr. HAECKER, in London, England, July 7, 1972. The following July 10-12, Mr. THOMPSON attended the annual Research Managers Conference, in Hannover, Germany, as the representative of the US National Committee for CIB. During the meeting he presented a talk on the energy crisis and environmental problems in the US.

USNCCIB ACTIVITIES

THE UNITED STATES NATIONAL COMMITTEE FOR THE INTERNATIONAL COUNCIL FOR BUILDING RESEARCH, STUDIES AND DOCUMENTATION (USNCCIB)

Background:

In 1962, under the sponsorship of the National Academy of Sciences, USNCCIB was organized to represent the United States as a full member in CIB.

The primary objectives of the USNCCIB are: to function as the liaison between US interests and the CIB and, thus, provide a mechanism through which the ready exchange of building research data generated by US private and public organizations and other CIB members is encouraged; to stimulate, through the establishment of counterpart commissions, the generation of research studies and information on the state-of-the-art in the field of building research and technology; and to motivate organizations to take positive action in furthering building research, studies and documentation.

As part of the National Research Council of the National Academy of Sciences-National Academy of Engineering, USNCCIB is in a unique position to provide liaison services at the international level in matters concerning the exchange of research data of interest to the various segments of the building community in the United States.

USNCCIB membership is composed of both participating organizations, private, non-profit, and national organizations and federal agencies conducting, sponsoring, administering, or utilizing building related research studies and documentation, and members-at-large, individuals appointed in recognition of their competence in building research and related activities without regard to their organizational affiliations. The Executive Committee coordinates USNCCIB activities and is composed of the USNCCIB Chairman, Vice-Chairman, and Representative to CIB and from four to six others elected from the membership.

Contracts or grants from various organizations provide the financial support for USNCCIB. Funds are received from the National Science Foundation, the Department of Housing and Urban Development, the Department of the Army Construction Engineering Research Laboratory, the Department of Agriculture Forest Products Laboratory, and the National Bureau of Standards/Center for Building Technology.

1972 Summary:

In order to provide a consensus view of US building and construction activities to serve as the basis for continuous active participation in CIB, the USNCCIB proceeded with plans for furthering its efforts in areas including the performance concept in building, new community development, and low-cost housing.

In connection with the economics of constructing and maintaining a large community complex, a task group is at work developing a program for identifying significant cost elements and making them visible as part of the total costs to be faced by a community in satisfying its working, recreational, social, and shelter needs.

Another task group on organization and management of construction is currently examining incentives and selection, contractual linkages, techniques and tools, and research.

An extensive effort was made this year to develop better methods for information exchange. A proposed program, called the Building Research Information Correlation Service (BRICS), is aimed at evolving a system for the exchange of research and technical information within the entire building and construction community by establishing and enhancing linkages among existing organizations in an informal network, improving the ability of individual service institutions to fill the needs of their respective audiences, and filling the information and communication gaps that are found to exist.

Finally, USNCCIB was commissioned by CIB to serve in a special liaison capacity this past year by working on its behalf with the Symposium and Steering Committees of the Joint Symposium on the Performance Concept in Building held May 3-5, 1972, in Philadelphia. (This Symposium is described in the RILEM Section of this report.)

During 1972, two CBT staff members played important roles in the USNCCIB structure. Dr. James R. WRIGHT, Director of CBT, began his third year as Vice-Chairman of USNCCIB, and thereby, a member of the Executive Committee, and Mr. James L. HAEKGER, Chief of the Scientific and Professional Liaison Section, CBT, was the NBS representative to USNCCIB.

ISO ACTIVITIES

International Organization for standardization (ISO)
1 Rue de Varembe
1211 Geneva 20
SWITZERLAND

Background:

On October 14, 1946, sixty-four delegates from twenty-five countries met in London to consider the establishment of a new international organization whose object would be to facilitate the international coordination and unification of industrial standards. Discussions led to the setting up of ISO, and the first provisional General Assembly of the new body took place in London on October 24, 1946.

ISO is a federation of the national standards institutes of fifty-four countries from all parts of the world. A member of ISO is the national body most representative of standardization in its country, and which has agreed to abide by ISO's Constitution and Rules of Procedure. It follows, therefore, that only one such body for each country is accepted for membership of ISO. In the case of the United States, the member organization is the American National Standards Institute (ANSI).

The work of developing International Standards is carried out through ISO technical committees, which constitute a forum for the exchange of ideas, with a view to the improvement of quality, increased production, lowering of prices, the expansion of trade and the organization of markets.

The work of the 146 technical committees is, in turn, divided into sub-committees and working groups; and via all these working parties, some 50,000 experts are engaged in the ISO work. Each year approximately 18,000 delegates from all over the world take part in more than 400 ISO meetings. In the past, the end result of the work has been published in the form of ISO Recommendations. By January 1, 1972, when ISO began publication of International Standards, nearly 2,000 Recommendations had been approved.

1972 Summary:

Various members of the Center for Building Technology (CBT) staff are involved in ISO technical committees (TC), either through membership in ISO subcommittees and working groups, or by serving in a US liaison function through the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), or the American Society for Heating, Refrigerating and Air Conditioning (ASHRAE).

US National Committee/ISO

Mr. P. R. ACHENBACH, Chief, Building Environment
Division, CBT

TC 35: Paints and Varnishes.

Standardization in the field of paints, varnishes and related products, including raw materials and terminology and methods of tests of finished products.

Dr. P. G. CAMPBELL, Materials and Composites Section, CBT

TC 50: Lac.

Standardization of all forms of lac, namely seedlac, bleached lac, sticklac, Kiri (refuse lac), etc.

Dr. P. G. CAMPBELL, Materials and Composites Section, CBT.

TC 71: Concrete and Reinforced Concrete.

Standardization of the technology of concrete for the design and construction of concrete and reinforced concrete structures, so as to ensure progressive development both in quality and in price reduction; and for definitions and terms, as well as testing procedures, to facilitate international exchange of research work..

Dr. B. E. FOSTER, Special Consultant, CBT

TC 86: Refrigeration.

Standardization in the field of refrigeration, including cryogenics.

Mr. P. R. Achenbach, Chief, Building Environment Division, CBT

Mr. C. W. PHILLIPS, Thermal Engineering Systems Section, CBT

TC 92: Fire Tests on Building Materials and Structures.

Standardization of tests for determining the properties of building materials and structures in relation to protection against fire of the building in which they are used.

Mr. I. A. BENJAMIN, Chief, Building Fires and Safety Section, CBT.

Mr. BENJAMIN attended meetings of Working Groups 2, 4, and 7 (Testing Methods, Reaction to Fire Tests, and Coordination and Correlation of Fire Tests) in Munich, Germany, March 6-10, 1972.

TC 104: Freight Containers.

Standardization of freight containers having an external volume of one cubic meter and greater, as regards terminology, classification, dimensions, specifications test methods and markings.

Mr. C. W. PHILLIPS, Thermal Engineering Systems Section, CBT

TC 108: Mechanical Vibration and Shock.

Standardization in the field of mechanical vibration and shock including: terminology; excitation by sources, such as machines, and vibration and shock testing devices; elimination, reduction and control, especially by balancing, isolation, and damping; evaluation of acceptable limits for man, and in machines, vehicles and structures; methods and means of measurement and calibration; and methods of testing.

Dr. R. A. CRIST, Assistant Chief, Office of Federal Building Technology, CBT.

CENTER FOR BUILDING TECHNOLOGY GUESTS

FOREIGN GUEST WORKERS

Background:

The National Bureau of Standards makes its facilities available for limited periods of time to certain qualified persons other than NBS employees to pursue individual scientific or technical projects under conditions determined by NBS.

The basis for acceptance of a guest work is an agreement between NBS and the guest worker which includes a work plan. Information or recommendations from outside organizations supporting a request for the acceptance may be submitted by a prospective guest worker, but such organizations are not considered to have any formal connection with the agreement. The following conditions apply:

1. Guest workers will be accepted only if the objectives of their proposed work will sufficiently benefit NBS objectives to justify use of NBS facilities and resources.
2. The guest worker's personal qualifications must be acceptable to NBS.
3. The guest worker will work in the laboratory of the host section chief, division chief, or another specifically designated appropriate NBS staff member.
4. By signing the agreement, the guest worker waives claim to compensation from the US Government. All guest workers must agree to conform to the administrative instructions and requirements applicable to NBS employees, including publication and invention policies.

1972 Summary:

As part of its overall interest in international cooperation, the Center for Building Technology (CBT) welcomes Guest Workers in line with general NBS policy. During 1972 the following Foreign Guest Workers had assignments in CBT on the subjects indicated.

- (October 4, 1971) - Dr. Eric BURNETT
May 1, 1972 University of Waterloo
Waterloo, CANADA
Assigned: Structures Section, CBT
Subject: Structural Research
- January 10, 1972 - Mrs. Tarja CRONBERG
(August 17, 1973) Swedish National Building Research Council
Stockholm, SWEDEN
Assigned: Architectural Research Section;
Office of Building Standards
and Codes Services, CBT
Subject: Building Performance Needs;
Performance Codes
- January 10, 1972 - Dr. Joseph WAPNARUK
July 1, 1972 University of Alberta
Edmonton, CANADA
Assigned: Structures Section, CBT
Subject: Structural Deflection
- July 5, 1972 - Miss Louise Mei-Zen LIN
(January 19, 1973) Union Industrial Research Institute
REPUBLIC OF CHINA
Assigned: Materials and Composites Section,
CBT
Subject: Plastic Pine
- July 31, 1972 - Mr. FONG Chan Yoon (United Nations Fellow)
September 21, 1972 Singapore Institute of Standards and
Industrial Research
SINGAPORE
Assigned: Materials and Composites Section,
CBT
Subject: Materials Durability
- July 31, 1972 - Mr. Ahmad JAVDAN (United Nations Fellow)
December 22, 1972 Mr. Mohammad ROSHDIEH (United Nations Fellow)
Ministry of Development and Housing
Teheran, IRAN
Assigned: Structures Section, CBT
Subject: Structural Research

FOREIGN VISITOR SUMMARY:

The Center for Building Technology (CBT) is always pleased to receive guests interested in the building field. Arrangements can be made to visit not only laboratory facilities but also staff members specializing in particular areas. In this manner professionals of foreign countries and CBT have the opportunity to exchange information and ideas on a completely informal basis. During 1972 the following foreign visits were officially recorded.

- January 3, 1972 - Mr. Honorio HERMETO
Centrais Eletricas de Minas Gerais S.A.
(CEMIG)
BRAZIL
Subject: Engineering Standards
- January 6, 1972 - Dr. Bruno HAKE
Fry Consultants, Inc.
Frankfurt, GERMANY
Subject: Building Materials
- January 18, 1972 - Dr. A. P. BRANTS
Mr. A. J. LUBACH
Sikkens Wapex, N. V. Kunsthaffen
Wapenyeld, NETHERLANDS
Subject: Building Joint Sealants
- January 20, 1972 - Mr. Paul PHILIPP
Institute for Technological Research
Sao Paulo, BRAZIL
Subject: Building Materials and Test Methods
- March 3, 1972 - Dr. Tatsumi KITAOKA, Director
Meteorological Research Institute
Tokyo, JAPAN
Subject: US/Japan Panel
- April 5, 1972 - Mr. W. W. L. CHAN
Consulting Engineer
Wembeley, UNITED KINGDOM
Subject: Operation BREAKTHROUGH
- April 13, 1972 - Dr. Kikuo SUMI
National Research Council
Ottawa, CANADA
Subject: Fire Research

- April 18, 1972 - Mr. Odd BRYNILDSEN
Mr. Aage HALLQUIST
Mr. Odd SJOHOLT
Norwegian Building Research Institute
Oslo, NORWAY
Subject: Operation BREAKTHROUGH
- April 25, 1972 - RILEM Permanent Committee (34 Members)
International Union of Testing and
Research Laboratories for Materials
and Structures
Paris, FRANCE
Subject: Building Technology
- May 1-2,
8-10, 1972 - Mr. A. F. E. WISE
Building Research Establishment
Garston, UNITED KINGDOM
Subject: US/UK Cooperative Program
- May 8, 1972 - Mr. Pierre RICHELLE, Executive Secretary
Syndicate of Interindustrial Construction
Studies
Brussels, BELGIUM
Subject: Building Technology
- May 8-9, 1972 - Mr. W. J. BIERRENS DE HAAN, Secretary
General
International Council for Building
Research (CIB)
Rotterdam, NETHERLANDS
Subject: CIB Committee Work
- May 8-9, 1972 - Dr. T. L. WEBB, Director
National Building Research Institute
Pretoria, SOUTH AFRICA
Subject: Building Technology
- May 8-10,
12, 1972 - Mr. Andrew GOODFELLOW
Industrialized Building Systems, Ltd.
Auckland, NEW ZEALAND
Subject: Building Performance
- May 9, 1972 - Mr. Juho SAARIMAA
State Institute for Technical Research
Helsinki, FINLAND
Subject: Performance and Durability of
Materials

- May 9, 1972 - Mr. Tenho SNECK
State Institute for Technical Research
Otaniemi, FINLAND
Subject: Lightweight Concrete
- May 9, 1972 - Dr. I. SOROKA
Israel Institute of Technology
Haifa, ISRAEL
Subject: Concrete Flooring and
Lightweighth Concrete
- May 10, 1972 - Mr. J. G. SUNLEY
Building Research Establishment
Princess Risborough, UNITED KINGDOM
Subject: US/UK Cooperative Program
- May 22-26, 1972 - Dr. S. C. C. BATE
Building Research Establishment
Garston, UNITED KINGDOM
Subject: US/UK Cooperative Program
- June 5, 1972 - Dr. S. M. NAUDE
Scientific Advisor to the Prime Minister
Pretoria, SOUTH AFRICA
Subject: Building Technology
- June 7, 1972 - Mr. D. O. OGUN, Director
Nigerian Standards Organization
Lagos, NIGERIA
Subject: Building Technology
- June 13, 1972 - Mr. DOUSSAIN
National Testing Laboratory
FRANCE
Subject: Building Technology
- June 16, 1972 - Mr. R. M. SINCLAIR
Department of Scientific and Industrial
Research
Petone, NEW ZEALAND
Subject: Surface Coatings
- July 3, 1972 - Mr. Rolf PERSSON
HSB
Stockholm, SWEDEN
Subject: Operation BREAKTHROUGH

- July 7, 1972 - Mr. Pierre CONSIGNY (and 4 Team Members)
 Director of Building, Public Works, and
 Construction Planning
 Ministry of Housing
 Paris, FRANCE
 Subject: Building Technology
- July 13, 1972 - Mr. Narayan DASSHARMA
 Indian Standards Institution
 New Delhi, INDIA
 Subject: Electrical Engineering
- July 24, 1972 - Mr. Isao IDOTA (and 9 Team Members)
 Japan Industrial Planning Association
 Tokyo, JAPAN
 Subject: Safety Works
- August 3, 1972 - Mr. Robert THOMPSON, National President
 Australian Housing Industry Association
 South Melbourne, AUSTRALIA
 Subject: Building Technology
- August 14, 1972 - Mr. J. R. FOWLER
 Irwin, Johnston and Partners Pty. Ltd.
 South Melbourne, AUSTRALIA
 Subject: Structures
- August 17, 1972 - Mr. Jack LANNEN
 Housing Commission, Victoria
 Melbourne, AUSTRALIA
 Subject: Operation BREAKTHROUGH
- August 25, 1972 - Dr. William H. MELBOURNE
 Monash University
 Clayton, AUSTRALIA
 Subject: Wind Loading
- August 30, 1972 - Dr. E. STEINBUCH
 Sprenger Institute
 Wageningen, NETHERLANDS
 Subject: Refrigeration of Food
- September 11-
 12, 1972 - Mr. N. C. HAUFFE
 National Building Research Institute
 Pretoria, SOUTH AFRICA
 Subject: Systems Approach to Building

September 11-
12, 1972 - Mr. J. BERTHIER
Mr. J. MATHEZ
Scientific and Technical Building Center
(CSTB)
Paris, FRANCE
Subject: Comparison of OBT Guide Criteria
and Agreement System (US/France
Cooperative Program)

September 13-
15, 1972 - Mr. D. SANDER (On Contract)
Mr. G. TAMURA (On Contract)
National Research Council of Canada
Ottawa, CANADA
Subject: Computer Prediction of Smoke
Movement

September 26, 1972 - Mr. Minoru SUGITA
Shimizu Construction Co. Ltd.
Tokyo, JAPAN
Subject: Structures Testing

September 26, 1972 - Mr. Richard DEPOURBAIX
Mr. Briane RANDAL
Central Mortgage and Housing Corp.
Ottawa, CANADA
Subject: Operation BREAKTHROUGH

October 5, 1972 - Mr. James LEWIS
A. R. I. B. A. Architect
Chippenham, UNITED KINGDOM
Subject: Disaster Mitigation

October 13, 1972 - Mr. Marion SCATCHERD
National Engineering Laboratory
Glasgow, UNITED KINGDOM
Subject: Data Retrieval

October 16, 1972 - Mr. V. V. MIKHAILOV
Prof. ALEXANDROVSKY
Soviet State Construction Ministry
U.S.S.R.
Subject: Structural Concrete

October 24-
25, 1972 - Mr. Imam SUGANDI
Power Research Institute
INDONESIA
Subject: Thermal Engineering Standards

- October 25, 1972 - Mr. Ivan GARMENDIA
Mr. Juan SAPENE
Venezuelan Standards Institute
Caracas, VENEZUELA
Subject: Building Technology
- November 1, 1972 - Mr. Rodolfo COSTAS, Director General
Standards and Technology
Ministry of Industry and Commerce
La Paz, BOLIVIA
Subject: Building Technology
- November 1-
14, 1972 - Dr. K. J. EATON
Building Research Establishment
Watford, UNITED KINGDOM
Subject: Wind Loads Cooperative Program
- November 2, 1972 - Mr. S. NIKKHOO, Head
Petroleum Products Research Department
National Iranian Oil Company
Tehran, IRAN
Subject: Bituminous Roofing Products
- November 15, 1972 - Mr. Tsunejiro EGAWA, (and 29 Team Members)
Daily Construction News Company
Tokyo, Japan
Subject: Building Technology
- November 28, 1972 - Mr. Jan - Ake JONSON
Mr. Carl Martin WIKLUND
Swedish Building Center
Umea, SWEDEN
Subject: Dissemination of Research
Information
- December 12, 1972 - Canadian Parliament Members (6 Members)
Ottawa, CANADA
Subject: Building Technology

CBT FOREIGN TRAVEL

In order to further develop the Center for Building Technology (CBT) staff, foreign travel is encouraged under certain circumstances. These include such occasions as interacting with overseas research groups involved in cooperative programs, participating in international organization meetings, or simply studying foreign approaches in the field of building technology. In all cases such travel provides the CBT staff an invaluable opportunity to broaden its professional outlook. CBT foreign travel for 1972 is described below.

- January 3-13, 1972 - Mr. W. R. HERRON, Coordinator
International Affairs, CBT
Location: POLAND
Purpose: Potential Special Foreign
Currency Program
- January 10-
12, 1972 - Mr. J. L. HAECCKER, Chief
Scientific and Professional Liaison
Section, CBT
Location: Ottawa, CANADA
Purpose: CIB Meeting
- January 10-
13, 1972 - Mr. W. J. PARKER
Building Fires and Safety Section, CBT
Location: Ottawa, CANADA
Purpose: Visit National Research Council
- January 18-
27, 1972 - Mr. W. F. REPS
Structures Section, CBT
Location: PERU
Purpose: USAID Project
- January 24-
28, 1972 - Dr. J. R. WRIGHT, Director
Center for Building Technology
Location: Paris, FRANCE
Purpose: RILEM Meeting; US/France
Cooperative Program
- February 28-
March 10, 1972 - Mr. I. A. BENJAMIN, Chief
Building Fires and Safety Section, CBT
Locations: London, UK; Stockholm, SWEDEN;
Munich, GERMANY
Purpose: Visit Fire Research Stations;
ISO Meetings
- March 17-18, 1972 - Dr. T. KUSUDA
Thermal Engineering Systems Section, CBT
Location: Toronto, CANADA
Purpose: ASHRAE Meeting

- March 20-22, 1972 - Mr. K. N. DE CORTE
 Scientific and Professional Liaison
 Section, CBT
 Location: Montreal, CANADA
 Purpose: Operation BREAKTHROUGH Meeting
- April 5-8, 1972 - Dr. R. A. CRIST, Assistant Chief
 Office of Federal Building Technology, CBT
 Dr. R. D. MARSHALL
 Structures Section, CBT
 Location: Ottawa, CANADA
 Purpose: Visit National Research Council
- April 16-20, 1972 - Dr. J. E. SNELL, Assistant Chief
 Building Environment Division, CBT
 Mr. D. J. MITCHELL
 Building Service Systems Section, CBT
 Location: Nassau, BAHAMAS
 Purpose: Visit Plumbing Installations
- April 17-30, 1972 - Mr. S. KRAMER, Chief
 Office of Federal Building Technology,
 CBT
 Location: FRANCE
 Purpose: Head Delegation under US/France
 Cooperative Program
- May 3-6, 1972 - Mr. K. N. DE CORTE
 Scientific and Professional Liaison
 Section, CBT
 Location: Montreal, CANADA
 Purpose: Operation BREAKTHROUGH Meeting
- May 13-
 June 9, 1972 - Mr. D. GROSS
 Building Fires and Safety Section, CBT
 Locations: Stockholm, SWEDEN, Paris,
 FRANCE
 Purpose: CIB Meeting; Visit CSTB Fire
 Research Station
- May 25-27, 1972 - Mr. J. G. GROSS, Chief
 Office of Housing Technology, CBT
 Location: Montreal, CANADA
 Purpose: Prestressed Concrete Institute
 Meeting

- June 24-28, 1972 - Mr. P. R. ACHENBACH, Chief
 Building Environment Division, CBT
 Mr. F. J. POWELL, Chief
 Mr. C. W. PHILLIPS
 Thermal Engineering Systems Section,
 CBT
 Location: Nassau, BAHAMAS
 Purpose: ASHRAE Meeting
- July 1-16, 1972 - Mr. H. E. THOMPSON, Deputy Director/
 Operations
 Center for Building Technology
 Locations: Oslo, NORWAY; London, UK;
 Hannover, GERMANY
 Purpose: Discuss Cooperative Programs;
 CIB Meetings
- July 1-19, 1972 - Dr. T. KUSUDA
 Thermal Engineering Systems Section, CBT
 Location: Paris, FRANCE
 Purpose: US/France Cooperative Program
- July 2-8, 1972 - Dr. R. N. WRIGHT, Deputy Director/
 Technical
 Center for Building Technology
 Locations: London, UK; Liege, BELGIUM
 Purpose: US/UK Complementary Program;
 RILEM Meeting
- August 11-26, 1972 - Mr. J. G. GROSS, Chief
 Office of Housing Technology, CBT
 Locations: London, UK; Stockholm,
 SWEDEN; Helsinki, FINLAND;
 Leningrad, Moscow, USSR
 Purpose: New Towns Tour; NAHB World
 Conference
- August 28-
 29, 1972 - Dr. E. SIMIU
 Structures Section, CBT
 Location: Ottawa, CANADA
 Purpose: Visit National Research Council
- September 8-
 23, 1972 - Dr. R. WEHRLI, Chief
 Architectural Research Section, CBT
 Locations: London, UK; Paris, FRANCE
 Purpose: New Towns Tour

September 10-30, 1972 - Mr. F. J. POWELL, Chief
Thermal Engineering Systems Section, CBT
Locations: London, UK; GERMANY; Paris, FRANCE
Purpose: CIB Meetings; US/France Cooperative Program

September 13-14, 1972 - Mr. H. E. ROBINSON, Senior Research Fellow
Building Environment Division, CBT
Location: Ottawa, CANADA
Purpose: Visit National Research Council

September 17-23, 1972 - Dr. J. E. SNELL, Assistant Chief
Building Environment Division, CBT
Location: London, UK
Purpose: US/UK Complementary Program; CIB Meeting

September 19-October 6, 1972 - Mr. S. G. FATTAL
Structures Section, CBT
Location: PERU
Purpose USAID Project

October 7-25, 1972 - Dr. T. KUSUDA
Thermal Engineering Systems Section, CBT
Location: JAPAN
Purpose: Speaker at Environmental Symposia

October 11-17, 1972 - Dr. J. R. WRIGHT, Director
Center for Building Technology
Location: Paris, FRANCE
Purpose: RILEM Meeting; US/France Cooperative Program

October 11-25, 1972 - Mr. W. C. CULLEN, Assistant Chief
Structures, Materials and Life Safety Division, CBT
Locations: Paris, FRANCE; Helsinki, FINLAND; London, UK
Purpose: US/France Cooperative Program; RILEM Meeting; US/UK Complementary Program

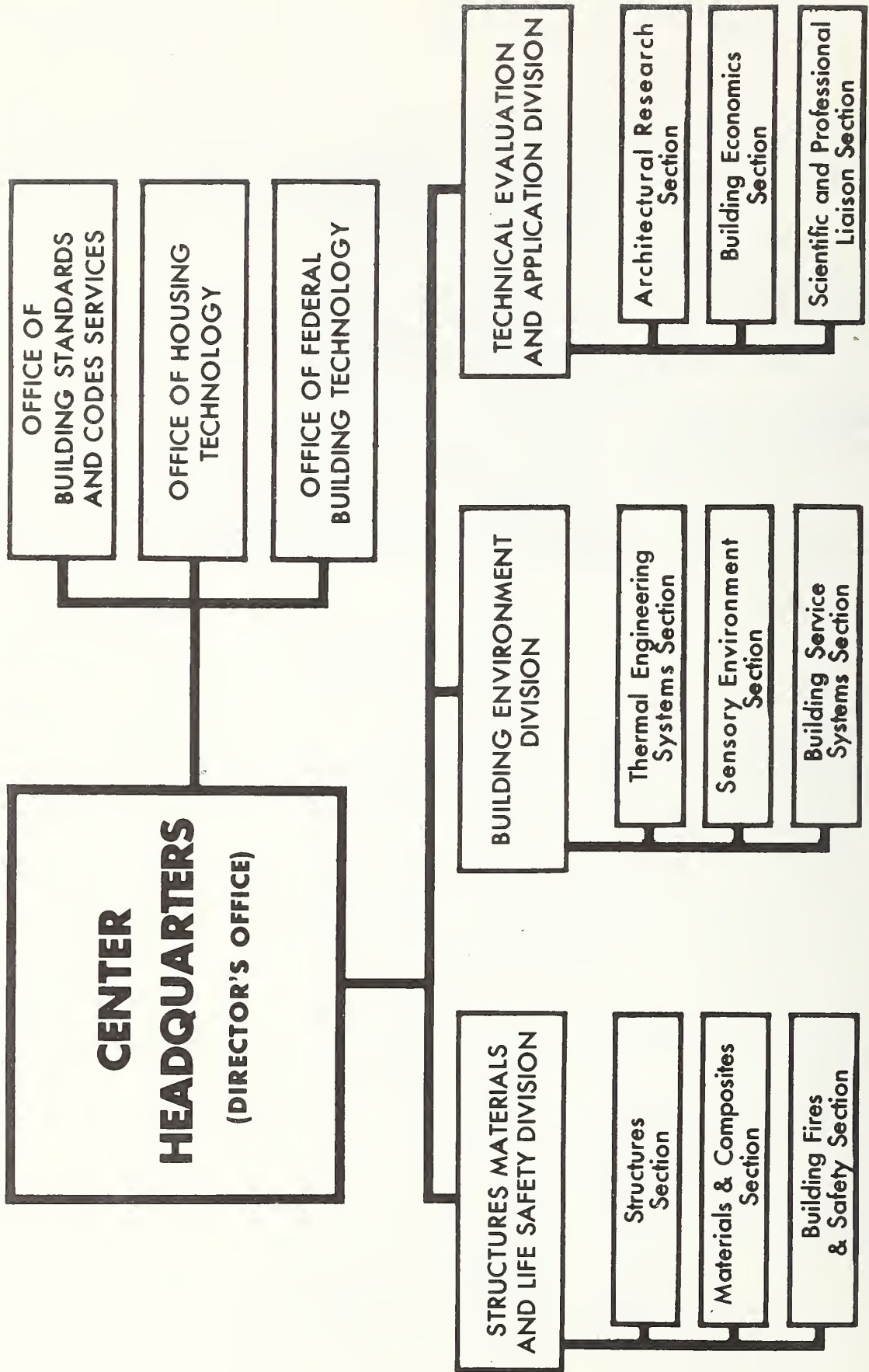
October 15-18, 1972 - Mr. H. E. ROBINSON, Senior Research Fellow
Mr. W. L. CARROLL
Building Environment Division, CBT
Location: Ottawa, CANADA
Purpose: ASTM Meeting

November 17-
 December 4, 1972 - Mr. H. R. TRECHSEL, Special Assistant
 Technical Evaluation and Application, CBT
 Location: SWITZERLAND
 Purpose: US/Switzerland Cooperative Program
 Study

November 30-
 December 10, 1972 - Mr. P. R. ACHENBACH, Chief
 Building Environment Division, CBT
 Location: Warsaw, POLAND
 Purpose: Micro-Environment Symposium

December 25, 1972
 (January 4, 1973) - Dr. R. N. WRIGHT, Deputy Director/Technical
 Center for Building Technology
 Mr. S. KRAMER, Chief
 Office of Federal Building Technology, CBT
 Location: Managua, NICARAGUA
 Purpose: Special Earthquake Study Mission

CENTER FOR BUILDING TECHNOLOGY



6/12/72

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15. SUPPLEMENTARY NOTES			
<p>16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)</p> <p>This report summarizes the Center for Building Technology's 1972 international activities including formal cooperative programs, exchange programs, special projects, international organization memberships, foreign guests at CBT, and CBT foreign travel.</p>			
<p>17. KEY WORDS (six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons)</p> <p>Cooperative programs; foreign visitors; information exchange; international building technology; international organization memberships; professional interaction</p>			
<p>18. AVAILABILITY <input checked="" type="checkbox"/> Unlimited</p> <p><input type="checkbox"/> For Official Distribution. Do Not Release to NTIS</p> <p><input type="checkbox"/> Order From Sup. of Doc., U.S. Government Printing Office Washington, D.C. 20402, SD Cat. No. CI3</p> <p><input type="checkbox"/> Order From National Technical Information Service (NTIS) Springfield, Virginia 22151</p>		<p>19. SECURITY CLASS (THIS REPORT)</p> <p>UNCLASSIFIED</p>	<p>21. NO. OF PAGES</p> <p>64</p>
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