

**IMPLEMENTING ARRANGEMENT  
BETWEEN  
THE U.S. ARMY COLD REGIONS RESEARCH AND ENGINEERING LABORATORY  
OF  
THE U.S. ARMY CORPS OF ENGINEERS  
AND  
THE TECHNICAL RESEARCH CENTRE OF FINLAND**

**Article I - PURPOSE AND AUTHORITY**

This Implementing Arrangement (IA) is entered into by and between the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) of the U.S. Army Corps of Engineers (USACE), and the Technical Research Centre of Finland, known as Valtion teknillinen tutkimuskeskus (VTT) for cooperation in cold regions engineering, scientific and technological research. This IA is entered into pursuant to the Agreement Between the United States of America and the Republic of Finland relating to the Science and Technology Cooperation Agreement of March 22, 1985, as amended and extended effective September 15, 1990. Except as otherwise specified hereinafter, all activities undertaken pursuant to this IA be subject to the provisions of the Science and Technology Cooperation Agreement..

The past cooperation between VTT and CRREL has been very fruitful, and a resumption of joint efforts in cold regions engineering will be of great benefit to both organizations.

**Article II - SUBJECTS OF COOPERATION**

a. The agreeing parties will develop various joint activities within the scope of this IA in the following general areas:

1. **Pavement Design and Geotechnics:** VTT is in the process of preparing a national research program dealing with road construction, which is expected to begin in 1994 and run for 5 years and will include the following items: frost design, drainage, use of waste or secondary materials (e.g. glacial tills), stabilization, the use of geosynthetics, physical properties of road construction materials, small and large scale laboratory tests, test constructions (test roads), road geotechnics, construction processes and quality assurance. This research will be available for Arctic-rim countries (such as the U.S.A.) and other international, (especially northern) contacts. The cooperation might include:

- discussions at the end of the planning phase,
- laboratory or other tests in CRREL facilities, and/or
- exchange of staff members.

2. **Concrete Technology:** This is an area where, in the past, VTT and CRREL have had fruitful cooperation. The durability properties of high-strength concrete are important in both countries, especially for bridge and concrete road construction. CRREL is capable of performing field tests in severe environments in a low-temperature coastal experiment field. VTT has facilities for microstructural studies of concrete. Also, VTT has been studying the use of slag as a binding agent in concrete, blended with Portland cement or activated with alkalies. VTT has experience in cold weather concrete construction techniques. Heating methods for concrete and the control of strength development are central to winter concreting. CRREL is currently studying the use of anti-freezing agents as admixtures. Cooperation in this area might include:

- increase the freeze/thaw durability of high-strength concrete
- use of blast furnace slag in concrete
- cold weather concrete construction
- explore new anti-freezing concrete admixtures.

3. **Action of Ice on Structures:** Both parties have ice basins and laboratory facilities for research in this area. Earlier contacts led to parallel test series on the problems of dynamic ice-structure interaction. This effort should be re-established. Cooperation in this area might include:

- discussions at the end of the planning phase
- laboratory tests in CRREL and VTT facilities
- exchange of staff members
- joint technical forum for test evaluation and results

b. Working schedules will be prepared by each party for each calendar year. These schedules will be agreed to and signed by both parties.

### **Article III - DESIGNATED REPRESENTATIVES**

a. To provide for consistent and effective communication between CRREL and VTT, each shall appoint in writing a representative to discuss and consider activities that may be pursued under this IA.

b. CRREL and VTT representatives shall coordinate all requests for cooperation under this IA and shall serve as the points of contact between CRREL and VTT on all matters relating to this IA.

#### **Article IV - OBLIGATION OF FUNDS**

Nothing in this IA or any subsequent agreements on a work schedule shall be construed to require CRREL to request, budget, or obligate funds for the purposes of this IA, nor to obligate any funds that have not been authorized and appropriated for this purpose.

#### **Article V - INTELLECTUAL PROPERTY**

The rights and obligations of the parties concerning intellectual property shall be governed by the Science and Technology Cooperation Agreement, including the Annexes thereto, except as this Article supplements and alters those provisions. All technical information developed through joint activities under this IA will be made available to both parties. Results of joint research may be published by either party unless otherwise determined in the annual working schedules or in specific project plans. The disposition of patents, designs, trade secrets, copyrights, rights in computer software and other proprietary rights in technical data, and all other intellectual property arising from cooperative activities under this IA shall be as follows: title in and to individual pieces of such property shall reside in the country of the party that hosted the work which resulted in the development of a given piece of such property, with reservation to the country of the other party of an exclusive-license in and to the given piece of property within its territories, and a non-exclusive license in and to the given piece of such property in all other countries, including the host country, except as may be specifically provided otherwise in the specific project plans adopted by the parties for any given joint research project entered into under this memorandum. Such project plans shall be approved in the same manner as this IA if they include intellectual property provisions not consistent with this article.

#### **Article VI - CONFIDENTIALITY**

Both parties agree to refrain both during the term of this IA and thereafter from using or communicating to third parties any trade secrets or confidential information so designated by either party relating to a party's products or business that the parties may come to know through their contact under this Agreement.

#### **Article VII - LANGUAGE**

The parties shall use the English language for all correspondence and for all documents exchanged.

#### **Article VIII - APPLICABLE LAWS**

This IA and activities under it shall be subject to the applicable laws and regulations of the nation hosting those activities.

**Article IX - EFFECTIVE DATE, AMENDMENT AND TERMINATION**

This IA shall become effective upon signature by both parties and will remain in effect for the shorter of three years or the life of the Scientific and Technical Cooperation Agreement. This IA may be amended by written agreement of the parties. Either party may terminate this IA by providing the other party with three months' advance written notice. Unless otherwise agreed, such termination shall not affect the validity of any arrangements made under this IA.

U.S. Army Corps of Engineers

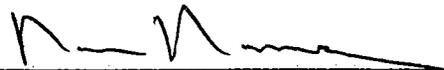
The Technical Research Centre of  
Finland

Cold Regions Research and  
Engineering Laboratory

Espoo, Finland, February 28, 1994



L. E. Link, Jr.



Markku Mannerkoski  
Director General

**TITLE:** Director

**DATE:** 6/10/94



Asko Sarja  
Research Director

## Co-operation Between the Technical Research Centre of Finland (VTT) and The U.S. Army Corps of Engineers (USACE)

### WORKING SCHEDULE 1994

#### 1. Co-operative study on high-strength concrete

This study was started during the visit of Dr. Heikki Kukko (VTT/Building technology) in USACE/CRREL in Spring 1991. Long term durability tests have been performed since then with test specimens prepared while the visit.

The project will be finalised and reported in 1994 jointly by Charles Korhonen and Heikki Kukko. The cooperation work will be done through correspondence.

#### 2. Pavement subcrete performance study

This project will be executed in cooperation between CRREL, VTT and the Danish Road Institute in order to investigate subgrade soil failure criteria. Additional cooperative partners will be the U.S. Department of Transportation/Federal Highway Administration and Finnish National Road Administration. The coordinating persons will be Dr. Vincent Janoo in CRREL and Mr. Matti Huhtala in VTT.

The project plan will be finalised in spring 1994. In the final planning the possibilities of linking the major research programmes in the participating countries to the CRREL/VTT -co-operation will be considered. Especially the starting Finnish Road Structures Research Programme (TPPT) and the on-going Long Term Pavement Performance study of U.S. Strategic Highway Administration will be discussed. The project is planned to include a 4...5 months' visit of a VTT's expert to CRREL as well as tests in CRREL.

### 3. Planning of the projects for the future cooperation

In the following topics change of information and preparation of co-operation will be carried out during 1994. Some of these themes will be chosen into the working schedule for the year 1995:

#### 1. Pavement design:

- the frost design of pavement and road construction

#### 2. Pavement performance and construction:

- the dependence of the modulus on the materials of base, sub-base and subgrade as well as on the freezing and thawing depth of the pavement
- the means to evaluate the actual pavement condition

#### 3. Use of geosynthetic products

- new solutions using geogrids and other geosynthetic products as reinforcement
- the use of geotextiles in decreasing the frost heave of soils

4. Frost insulation and drainage of roads
  - the use of frost insulation in roads and streets
  - the use and functioning of frost insulations of different materials in roads
5. Use of recycling waste and sub-products and reuse of road materials
  - the use of industrial sub-products, waste materials and "second-rate" soil materials in road building
6. Environmental geotechnics
  - the effects of freezing and thawing on the clay and silt layer used as barrier structures near the surface
7. Soil laboratory equipments and investigations
  - use of dynamic triaxial equipment for testing the resilient modulus of materials at various temperatures
  - use of ground penetrating radar or some geoelectrical monitoring equipments to build up a vertical cross-section and, even more, to evaluate the properties of different layers pavement and of subgrade of an old road
8. Concrete technology
  - the frost resistance of high strength concrete made with inert fillers and by-products
  - the use of roller compacted concrete and earth concrete in cold climate
9. Ice engineering
  - numerical modelling of ice-structure interaction
  - change of experimental results

Espoo 28. February 1994

Acting Research Director

  
Asko Sarja