A Brief History of Bio-Tech Co

On August 30, 2012, Bio-Tech Co. observed its 40th anniversary. The company was registered in Toronto and located in limited premises. Shortly after its formation, the company was relocated to larger premises in Lynden, ON. The initial business of the company was to provide instrumentation engineering service and design contract work as well as prototype and small volume production in our shop facilities. Prof. Ruven Kitai of McMaster University and Mark Triska, BASc. EE acted as consultants for the company. These two people were invaluable for the embedded control work which we were engaged in pursuing. Some of the more noteworthy early accomplishments include:

Microbiological replicating device.

Trade mark **"Replicator"** which is described in the Canadian patent No. 990101. This patented equipment is a microbiology laboratory device[1] for applying microbiological samples in a specified pattern to Petri dishes prior to their incubation. A pattern of up to 36 samples in one application may be applied which is a significant improvement over the former method of applying one sample at a time.[1] A trade mark for the equipment was applied for and was registered as "Replicator". Licensing arrangements for manufacture and marketing of the equipment were made with a laboratory equipment manufacturer after a pilot run of the equipment was completed in our own shops.

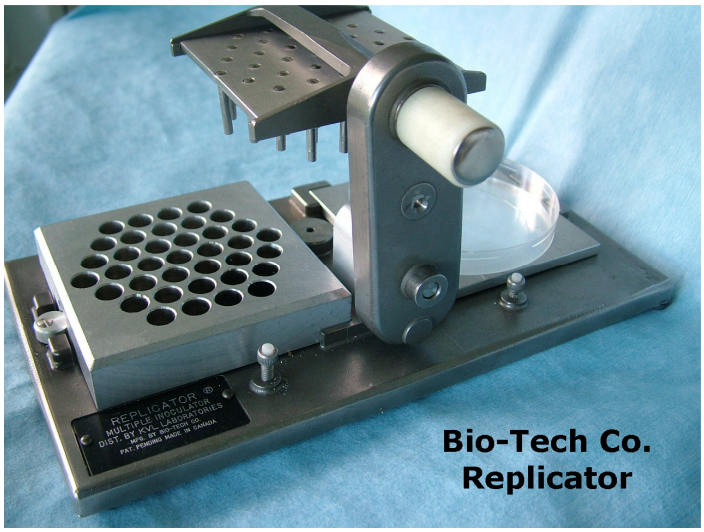

Figure 1; Bio-Tech Co. Replicator

Air quality monitoring.

Low level air quality measuring equipment for **CAPMON** (Canadian Air and Precipitation Monitoring Network) which is a division of Environment Canada. This equipment is a 3-stage filter pack method of collecting environmental data. The first stage filter collects particulate sulphate, nitrate, chloride, calcium, magnesium, sodium, potassium and ammonium. The second stage filter is for selective absorption of vapor phase nitric acid. The third stage filter is treated for detecting SO_2. There are several of these units installed in monitoring stations across Canada.

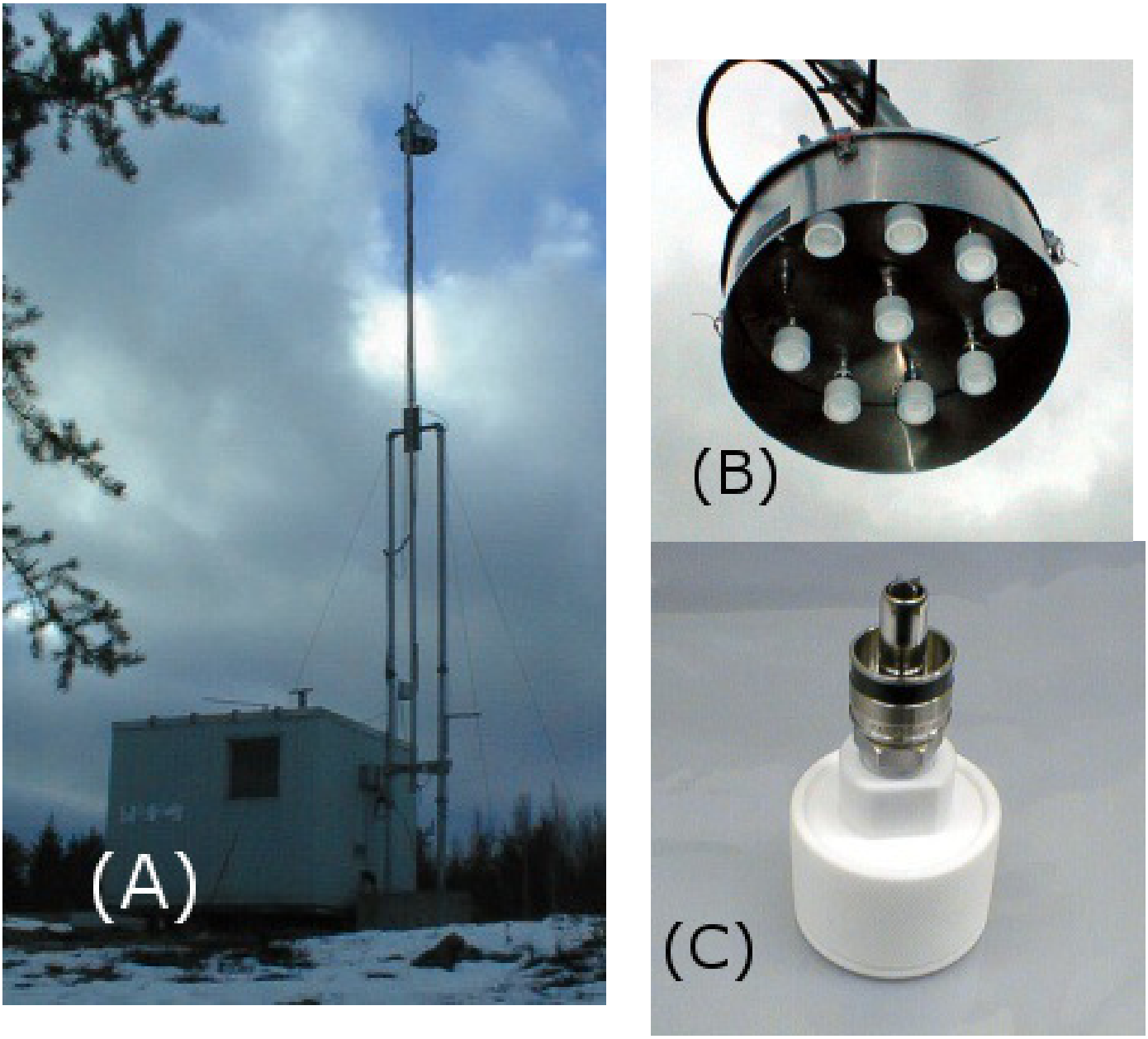

Figure 2: (A) Typical air-sampling installation. (B) Underside view of the sampling head. (C) Teflon 3-stage filter pack.

Electronic stimulator for pain suppression.

Previous equipment for Transcutaneous electrical nerve stimulation (TENS) was heavy and bulky. A lighter and more compact unit was developed and has gone into production by a medical instrument company. The design we developed was more compact and lighter. Previous units were bulkier and were usually carried over the shoulder.

Figure 3: Right Bio-Tech prototype. Left: Commercial TENS product.

Digital readout for materials testing equipment.

Traditionally the data display on material testing compression testing machines is a Bourden gauge which displays the force applied to a test specimen. The gauges have the typical black pointer to indicate force and a second red pointer to hold the peak force after failure of the test piece. Our design was to replace bourdon gauges in the older machines with digital recording equipment. The digital equipment had added features such as recording multiple peaks and providing a paper print out of the data.

Figure 4: Digital data collector for material testing equipment.

Control instrumentation for electric generating equipment.

Engine driven electric generating equipment is typically equipped with many gauges and meters. Our design was a unit to replace the analog gauges in one compact package. By combining the meters and gauges into one package reduced the manufacturing cost for the client. Also provided in the unit were "smart" functions such as auto or remote start for the diesel engine.

Pile driving data recorder.

The pile driving industry demands that accurate data be provided in their pile installations The recorder collects energy data delivered to a pile while it is being installed. The energy expended to the pile is recorded on a blow-by-blow basis and then averaged. An immediate print-out is available to the operator. Blows per unit length is provided as well. This information is a figure of merit of the soil conditions.

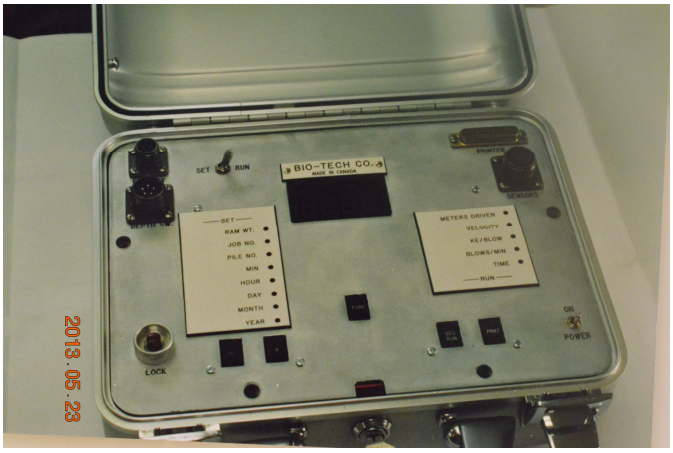

Figure 5:; Prototype pile-driving data recorder.

Figure 6: Preproduction run of pile-driving monitors

Concrete maturity measuring equipment.

The relationship between concrete strength and its maturity is measured with this instrument[2]. Basically the temperature-time product is measured. The maturity of curing concrete is greatly influenced by ambient temperature. This is taken into account with this instrument.

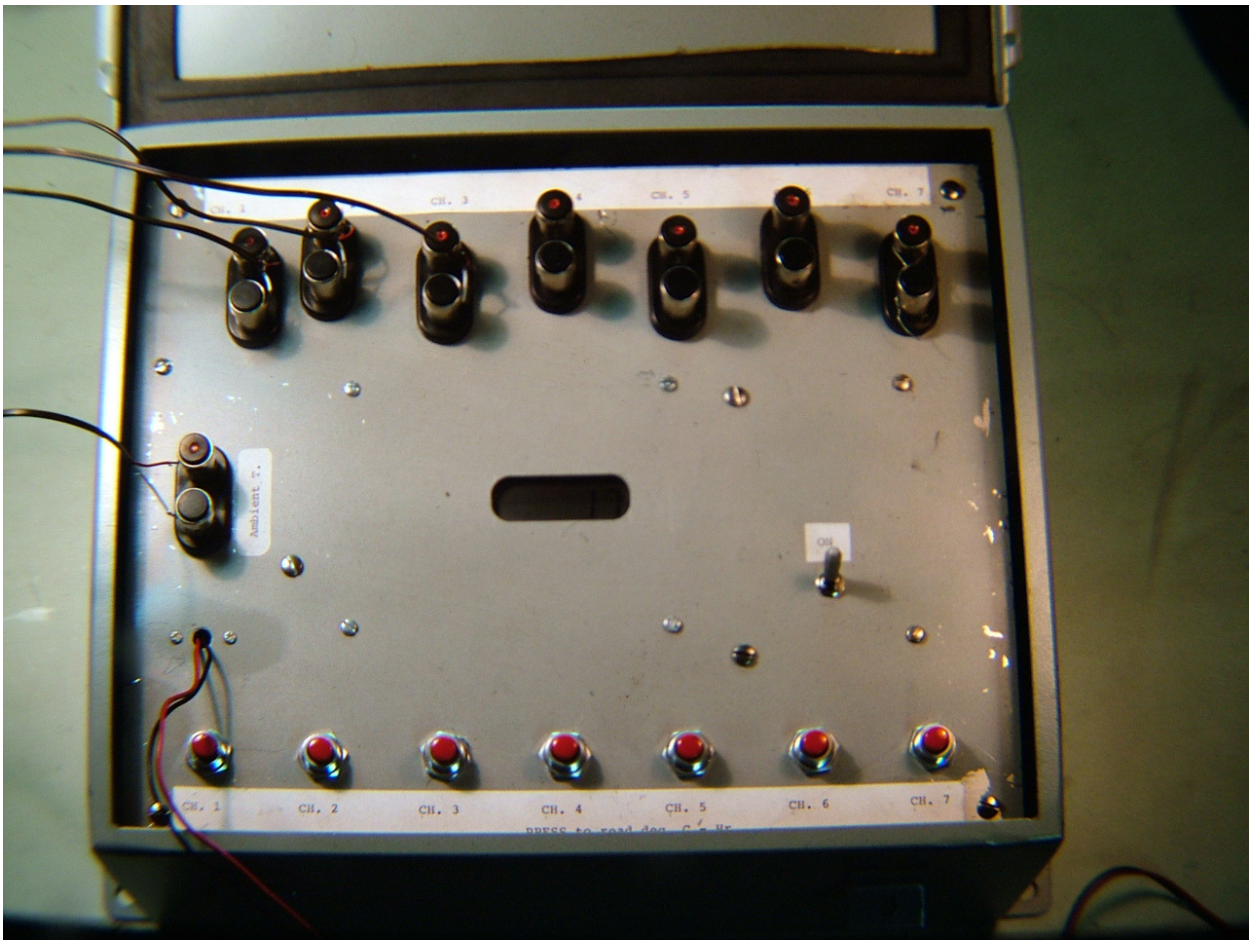

Figure 7: Concrete maturity instrument with eight thermocouple inputs.

Some Limited production or custom research tools.

Note: Most of the following projects developed were custom in nature and, therefore, had limited production. They were intended as research tools and, therefore, had no particular commercial value at the time. They were, nevertheless, valuable tools for the researcher.

Head Camera[3] constructed for eye motion research. A professor, with a specialty of human factors engineering, was undertaking a research project to study eye movements while a person was performing various tasks. When this work was done digital cameras was still a rarity hence the use of film cameras. A basic commercial 8 mm camera was used in this case. A periscopic attachment to observe the eye position was added and a mounting arrangement was provided to support the camera on a helmet.

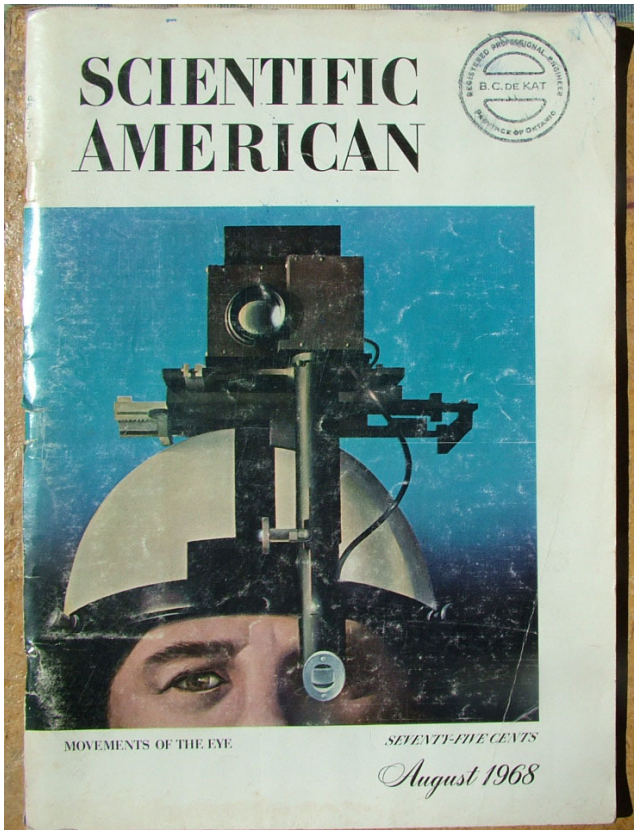

Figure 8: Eye-movement camera mounted on a helmet.

Bladder sphincter measurement[4]. A rehabilitation specialist required a method of measuring the strength of the male bladder sphincter strength during rehabilitation after bladder surgery. There was no commercial equipment available for this task so we developed a transducer using strain gauge techniques. The transducer enabled the specialist to assess the progress of the therapy given to his patients. With this device the specialist was able to assess the progress of the therapy of his patients by doing periodical measurements. The data obtained provided enough information for a published paper.

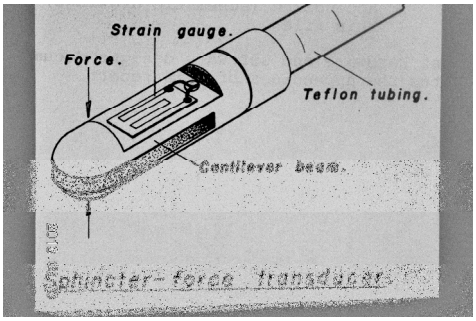

Figure 9: Sphinctor transducer details

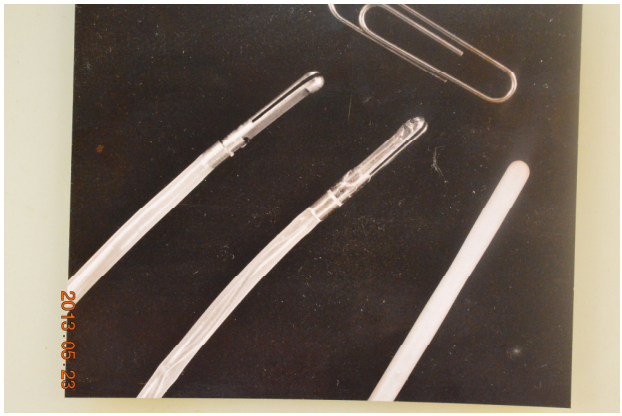

Figure 10; Unit on the right is covered with latex.

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Statistical collecting apparatus. Eight channel tallying equipment for blood cell analysis. Microcontroller enables data to be averaged, etc. by the push of a button.

Figure 11: Prototype data collecting device.

Crane instrumentation[5] for two unique cranes built for lifting hydro towers under live-line conditions. We designed and provided the digital Instrumentation for cranes. X,Y and Z of a lift were displayed to the crane operator. X and Y movements were 1 ft. each and the Z movement was 18 ft. Display is presented in digital form. Resolution was 0.1 in. Only two of these cranes were built to do an upgrade of about 250 towers in Ontario.

Figure 12; Tower cranes

Figure 13: Readout panel

Viscosity recording instrument for "mud" in a brick manufacturing plant. As the mud is extruded the viscosity control is important for good quality brick production. Equipment was provided to display a continuous readout of viscosity.

The "Surfactometer" was developed for a research team performing research on evaluating pulmonary surfactant. The results of the data obtained is necessary in developing a surfactant treatment for premature infants with breathing difficulties, called Infant Respiratory Distress Syndrome (IRDS)[6].
This specialized instrument was manufactured in very limited quantities..

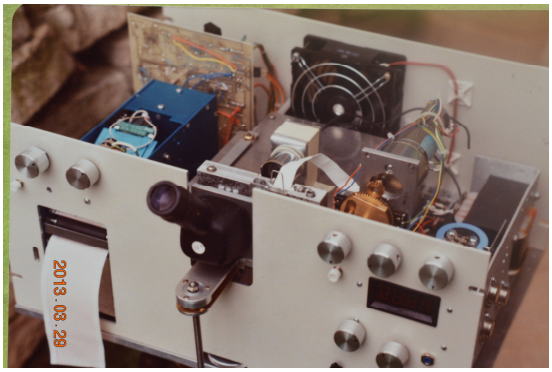

Figure 14: Surfactometer pre-production prototype

For physiological studies of humans under high "G" force stress i.e fighter pilots, it is important to record blood quantity in the head during stress experiments. An ear opacity instrument was developed to satisfy this need These studies were done with the aid of a centrifuge provided by the Department of National Defence.

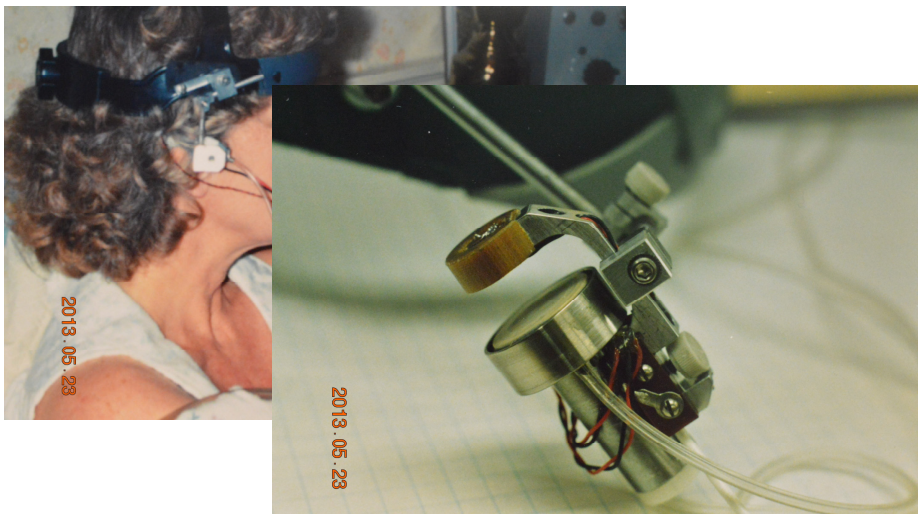

Figure 15; Ear probe assembly

Invitro optical Eye Lens Monitor[7]
Canadian Industrial Innovation Centre, Waterloo, ON
This apparatus which is used for evaluating consumer hygiene products for irritancy. Some of the items tested were lotions, shampoos, deodorants, anti-perspirants, etc. The sensor involved is a lens of a bovine eye which is scanned with a laser beam. The amount of change of the focus of the lens is a function of the amount of irritancy.

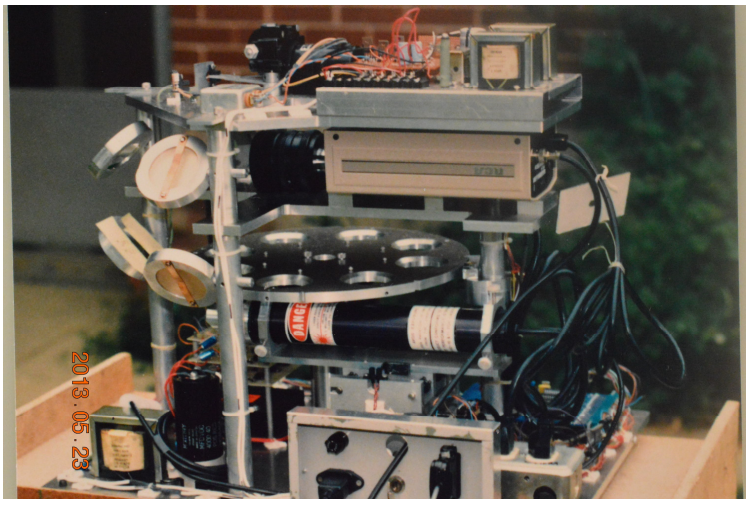

Figure 17: Eye lens measuring unit.

Royal Military College contracted our company to upgrade the instrumentation of a large telescope in their physics department.

Atmospheric Environment Service (SODAR): Grey scale chart recorder for recording data from acoustic radar apparatus used in meteorological work.

Optokinetic Stimulus Generator.
A projection apparatus for nystagmus research studies in patients.

---------- References ------

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2. 1984 B. C. de Kat "A Microcontroller Concrete Maturity Meter," Paper given at: The 1984 International Conference on Industrial Electronics, Control and Instrumentation. Tokyo, Japan October 22 - 26, 1984.

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4. R. E. Renaud, J. S. Crawford, P. Crassweller, B. C. de Kat "Study of Bladder "Shut_Off" Mechanism in a Group of Incontinent Patients at the Toronto Western Hospital," Paper delivered at: The 2nd Canadian Medical And Biological Engineering Conference. September 9, 10 & 11, 1968. Toronto, Canada.

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