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East Europe Report

SCIENTIFIC AFFAIRS

No. 781

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CONTENTS

VARS AUTOMATED MANAGEMENT SYSTEM UNIQUE WITHIN CEMA

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1983 pp 9-11

[Article by Engineer Zaboj Statecny, chief engineer of the VARS Project: "The VARS System Has Successfully Passed Its National Tests"]

[Text] Tests of the first stage in the development of VARS (Multilevel Automated Management System), held on 29 and 30 November 1982 in the Havelska Street computer center of the Kancelarske Stroje (Office Machines) Special-Purpose Concern Organization, were successful.

The VARS system is a result of several years of effort, based on the long experience of the team of programmers at Kancelarske Stroje, and of teams of programmers at an entire series of cooperating organizations as well. The national tests are an important milestone in the development of the entire system. The time has arrived for the system's practical application, and therefore it will be appropriate to provide information about some of the basic aspects that describe the system in greater detail.

We have in mind particularly the following:
--Characteristics of the VARS system from the viewpoint of its design;
--Description of the conditions under which the VARS system arose;
--Purpose of the national tests, from the developers' viewpoint;
--Main objectives in the next stage of development.

VARS System and Its Design

The VARS system is being developed within the framework of a state task. It is standard applications software, intended particularly for users of the EC 1025 computer and its improved versions. In general, however, it is intended for all computers of the JSEP [Unified System of Electronic Computers] 2 series (3.5th generation computers) that run under DOS 3.

VARS is intended for organizations in the business and enterprise sphere, with the understanding that specific parts of VARS are modeled on engineering production, respectively on production with similar design and technological characteristics as in engineering.

Thus VARS is standard applications software. Hence it solves that part of an automated management system's tasks for which there are algorithms, but it does not contain the solution of a complex management system. It represents software support for automated management systems and can serve as an important tool for developing complex automated management systems at a number of organizations, because it starts out from an analysis of the content and developmental trends of management systems as a whole. It solves also the essential linkages to the nonautomated parts of automated management systems.

VARS has modern modular design based on the building-block principle, and it employs extensively also the methods of structured design and programming.

It relies on the fairly vast experience with the application of the MARS [expansion unknown] standard project that was adopted by more than 200 enterprises, producing demonstrable great gains for society as a whole.

Thanks to the developers' efforts and to the basic characteristic of the VARS system's construction, the necessary integrity of the entire system was achieved by the following means:

1. The common denominator of the entire system became the catalog of data elements that accurately describes and characterizes every data element used within the system.

2. The DBS 25 data bank system, on which the VARS system is based, maximally utilizes this system as its first large user.

3. The VARS system's programming method is based on using standard elements. A standard element is a functionally and algorithmically terminated, modifiable part of the applications software that effectively can be used repeatedly within the system, respectively in the individual subsystems. This provides the prerequisite for resolving the contradiction between the system's standard nature and the individual organizations' specific requirements.

4. Another unifying factor is the documentation, prepared in accordance with principles and methodological instructions that were determined in advance. The documentation respects the principles of structured design and programming.

5. The internal and external linkages, which enable VARS to be presented as a compact system, are likewise an integrating factor.

In this way a truly integrated system has been developed that is unique within CEMA.

The VARS system covers all basic areas of an enterprise's activity. It comprises nine subsystems: Technical Preparation of Production (TPV), Operational Management of Production (ORV), Supply of Materials and Equipment (MTZ), Labor and Wages (PAM), Economic Information (EKI), Sales (ODB), Management of Tools (NAR), Fixed Assets (ZAP) and Technical and Economic Planning (TEP). In comparison with MARS, the difference stems from the fact that the entire system was designed and developed on its entire front, i.e., all the basic subsystems were designed and developed at the same time, with all the necessary system linkages. The VARS system's advanced design may be summed up in the following points:

--Information is processed in the data base.

--The main flows of information between subsystems are realized predominantly through the central data bank.

--Actual programming of the subsystems is relatively independent of the data base that the user is able to generate as needed, with the macroinstructions used to describe the files.

--The software is independent of the input/output peripherals.

This creates favorable conditions for the interactive mode of operation. To avoid negative phenomena similar to what occurred in the MARS system's application, the first 20 large enterprises are being trained for the VARS system's application. Negotiations are under way with additional large concerns that will adopt the VARS system for all their enterprises.

Description of Conditions Under Which VARS System Arose

The VARS system is an extensive project, unparalleled in the CEMA countries. A large number of software developers participated in it, which placed considerable demands on management and coordination.

No less demanding was coordination within the individual teams of software developers, since these were joint teams. The idea of combining software developers from different work stations into a joint team is very appealing, but it does have a number of drawbacks, especially when the work stations are not equipped with the same type of computer hardware. And the fact remains that the programmers at each work station have their own characteristic handwriting, which can be reduced to a common denominator only with considerable difficulty.

Another problem was the fact that the software developers had to test not only their own programs, but--as the first large users--also the operating system (including the data bank) and the computer hardware. A series of problems had to be overcome especially in this area. Since the national tests used the operational data of the ZPA [Machinery and Automation Plants] Concern Enterprise of Kosire, there were considerable problems also with the DBS 25 data bank system, until about 200,000 sentences were successfully stored in the central data bank.

Applications software developers do not have at their disposal, from the research work stations, sufficiently elaborated and especially realizable models of enterprise management conforming to the requirements placed on these systems (we have in mind the new status of the economic production unit, the integration of levels of management, and the solution of statewide cross-sectional problems). Thus the main source of information for the software developers was the experience gained at scores of enterprises with the application of the MARS system.

Purpose of National Tests

From the viewpoint of the software developers, the national tests can be regarded as the culmination of control and testing, before transferring the VARS system to the NOTO [National Technical Service Organization] Library.

In our opinion, furthermore, the national tests provide an opportunity for the wider public to become acquainted with the content of the VARS applications software and the conditions of its operation, which is an important prerequisite for its wide-scale application. This is also a significant opportunity to gain further suggestions and comments, which could contribute to the system's perfection and further development.

Main Objectives in the Next Stage of the VARS System's Development

The applications software of the first stage in the VARS system's development is geared to the batch mode of the computer system's operation and includes the solution of the key tasks of the basic subsystems that were also a part of the MARS system.

The second stage will represent not only an expansion, but also a certain qualitative change of software development.

The main objectives of the second stage of the VARS system's development can be formulated as follows:

--Changeover to real-time processing of selected tasks in certain subsystems, especially in the Operational Management of Production and in the subsystems directly linked to production. Utilization and adaptation of the resulting SMEP [System of Small Electronic Computers] applications software for this purpose, and its integration into the multilevel VARS system.

--Linking the resulting applications software's selected standard elements for the intermediate level of management with the applications software for the ASRP [Automated Enterprise Management System], and further reinforcing the multi-level nature of the VARS system.

--More consistent projection of the perfected planned management system's principles into the applications software of the first stage of development, and linking this applications software more closely with the statewide automated information and management systems (JUZO [expansion unknown], ISI [Integrated Statistical Information System], etc.).

--Expansion and intensification of the applications software written in the first stage, in accordance with the course and results of its testing, including the wider use of the common data base and of the data-base mode of operation in the subsystems.

--Writing and testing implementation projects for additional subsystems (quality, transport, energy, management of computer centers) and their inclusion in the VARS structure.

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ANTICORROSIVE AGENTS FOR OCEANGOING MACHINERY EXPORTS ANALYZED

Prague STROJIRENSTVI in Czech No 2, 1983 pp 119-125

[Article by V. Urban, V. Svoboda and Eng P. Bouska, CSc, CKD Research Institute, Prague: "Assessment of the Resistance of Machinery Products During Transoceanic Transportation"]

[Text] The article summarizes the results of systematically carried out tests of protective systems for machinery and electrotechnical products of the CKD [Ceskomoravska Kolben Danek] plant in the course of oversea transport. The extensive assortment of tested materials for systems offering permanent and temporary protection (to include packaging) enabled the authors to acquire detailed information about the corrosion resistance of routinely used materials and the protective effects of organic and metallic coatings, means for temporary protection as well as complete systems for temporary protection used in exports of machinery products. The results of these tests and the conclusions derived from them are of value not only for the CKD, but also for other exporters of machinery products.

Most of the production of the CKD branch enterprise is exported, often to countries with aggravated climatic conditions. The need for adequate resistance of products to effects of the climate during transportation and utilization led the Research Institute of CKD Prague to its preliminary verification by exposure in climatic stations on Czechoslovak oceangoing ships. The results obtained in the course of more than 15 years made a considerable contribution to achieving an adequate resistance of products to climate and to selecting optimum systems both for their temporary and permanent resistance against corrosion. All experiments were coordinated with analogous studies made by SVUOM [State Research Institute for Protection of Metals] and IMADOS [Institute for Handling and Transportation Systems] Prague, making it possible to introduce many viable coating and packaging systems for use in production by CKD. Significant findings were made also in research of climatic resistance of structural plastics.

1. Introduction

An important factor affecting the reliability and service life of machinery and electrotechnical products is their resistance against corrosion and/or resistance against climatic effects in general. Chemical and, in the case of organic materials, also biological degradation processes can in a very short time affect the functional properties of some parts of systems to the point that the unit as a whole fails to achieve the designed output features or breaks down.

The problems of damage to products by corrosion and biological effects have been receiving considerable attention in the production of the CKD branch enterprise for many years. The impetus for it was provided by the need for long-term functional performance of products in both European and tropical and subtropical climatic conditions.

From the viewpoint of corrosion, the critical stage for the service life and reliability of products, particularly those for exports, is often their transportation and storaging at the point of destination. Part of filling orders for export is a detailed analysis of the manner in which the goods are to be transported and the climatic conditions at the point of destination. From it are derived the requisite design and technological modifications (the so-called tropicalization) of products which are to facilitate their reliable functioning even under adverse climatic conditions. At the same time, the manner for temporary protection against corrosion--preservation and packaging—of products including replacement parts during transportation and storaging is selected.

Underestimation of the corrosive effects of the atmosphere and inadequate protection of exported products against corrosion became the source for many major complaints in the early sixties. The situation was dealt with by State Commission for Technology Exports Decree No 162/64 regarding implementation of measures designed to promote climatic resistance of products exported to areas with adverse climatic conditions and the followup instruction by the minister of foreign trade of 1965 "Obligatory Testing of Products Slated for Areas With Adverse Climatic Conditions." A plan for long-term climatic tests was worked out in the CKD Research Institute Prague to meet their provisions. The most important part of the plan was testing on the high seas on Czechoslovak oceangoing ships, which from the viewpoint of climatic exposure is of prime significance.

Results of the assessment of long-term climatic tests on the high seas are provided for informational purposes. The results confirmed that sea tests progressed under the effects of combined corrosion factors:

--alternation of extremely low temperatures with high temperatures;

--high relative humidity;

--seawater spray;

--intensive solar radiation with strong effects of the ultraviolet component;

--mechanical stress due to wind and waves;

--deposition of combustion products of propelling and auxiliary diesel engines of ships and other factors.

Under such conditions it is possible to determine the corrosion resistance of the exposed materials and parts quite well in a relatively short time.

The CKD Research Institute turned to the directorate of the Czechoslovak Seagoing Navigation with a request for establishing a climatic station on the high seas. Its positive approach made it possible to place relatively large testing systems on Czechoslovak seagoing ships plying various climatic zones. As an example, in Figure 1 is shown the route covered by a ship in the course of 6 months. Figure 2 shows the progress of average daily air temperatures.

The extensive test program stretching over approximately 15 years can be roughly divided into the following tests of resistance against corrosion:

--systems providing permanent protection (coatings);

--systems providing temporary protection (preservation and packaging);

--plastics.

This division is also used to present key results of the tests.

2. Systems Providing Permanent Protection

2.1 Coating Systems (1-7)

The following coating systems were tested in several stages (thickness of coatings is given in micrometers):

First Stage (3-year Test)

The following systems were rated as utterly inadequate after the first year:

--asphalt A 1001, A 1008, coat thickness 100 to 120 μm;

--nitrocellulose C 2001, C 2012, C 2004, C 2124, coat thickness 120 μm;

--oil O 2005, O 2011, O 2016, coat thickness 80-100 μm;

--synthetic S 2013, S 2014, S 2021, S 2901, coat thickness 90-110 μm;

--priming coats S 2000, S 2005, S 2002.

Prefinishing of surfaces of the samples was done either by regrinding with emery cloth (in samples less than 1 mm thick) or by sand blasting of samples

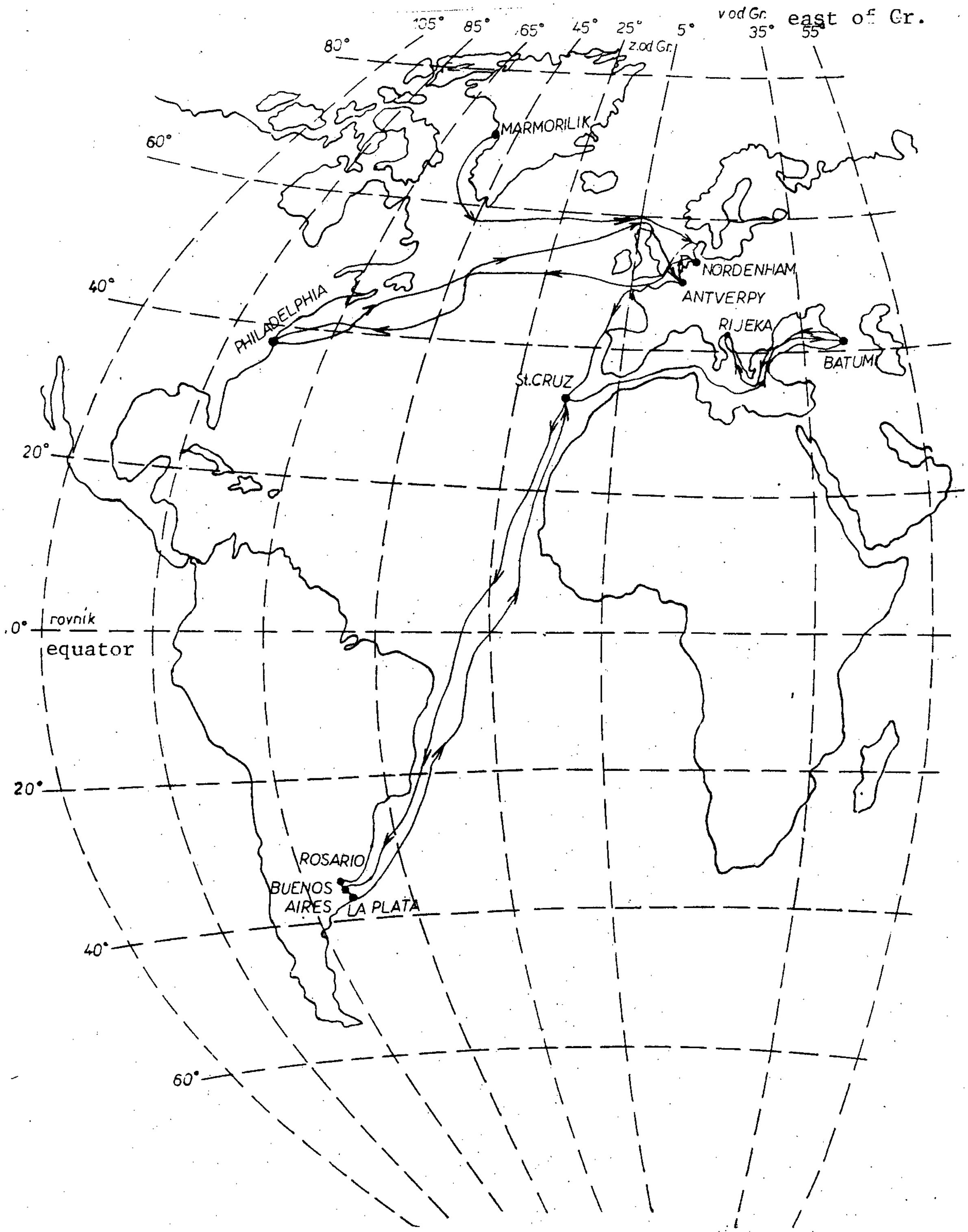

Figure 1. Routes Covered by a Czechoslovak Seagoing Ship in the Course of 6 Months

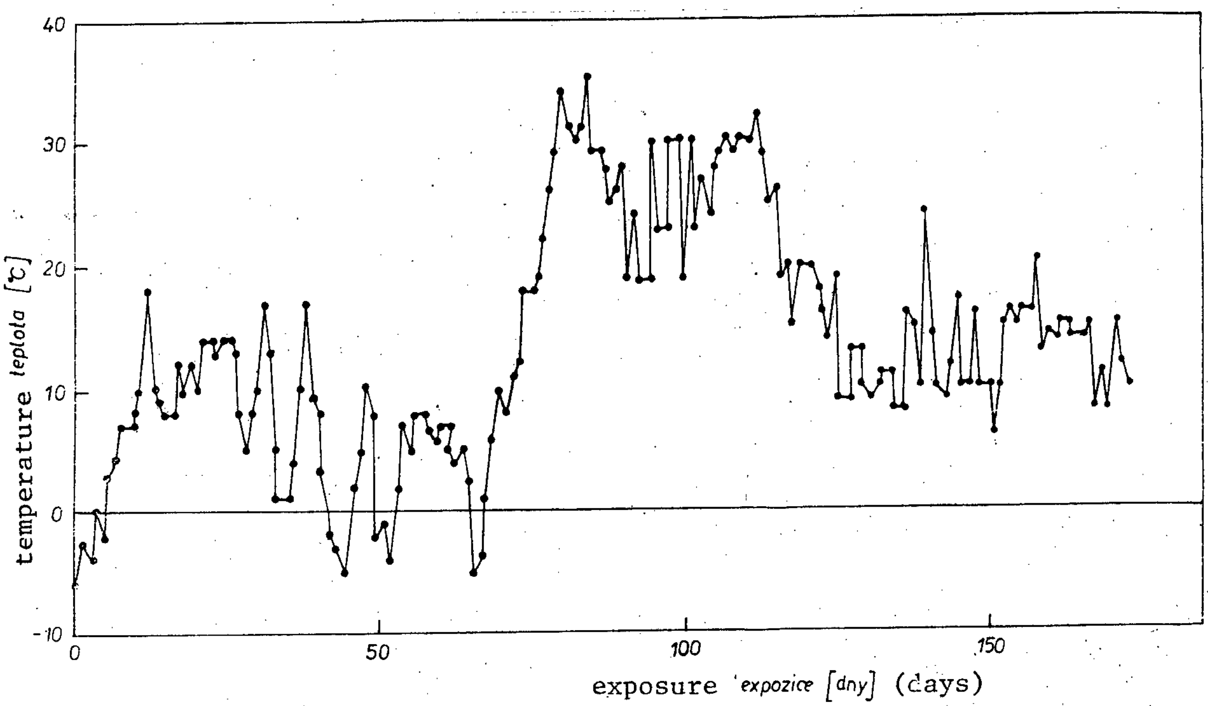

Figure 2. Plotting of Daily Average Air Temperatures Along the Route in Figure 1.

with thickness in excess of 2 mm. Degreasing was done by industrial benzene. Samples were sprayed, only oil and asphalt samples were coated by brush.

After the second year there was degradation of the following systems:

--synthetic S 2035, S 2034, S 2038 (coat thickness 100-120 μm), S 2035, S 2901/F, S 2902 (coat thickness 120 μm), S 1004 (coat thickness 80-90 μm);

--epoxy S 2300, S 2311, S 2322 (coat thickness 90-110 μm), S 2322, S 2321 (coat thickness 110-130 μm);

--polyurethane U 2000, coat thickness 80 to 100 μm.

A 3-year exposure without overall degradation was withstood by the following systems:

--nitrocellulose C 2023, C 2023/K, coat thickness 160-180 μm;

--chlorinated rubber H 2100, H 2001, H 2004, coat thickness 110-130 μm;

--oil O 2301, O 2302, coat thickness up to 180 μm;

--synthetic S 2029, S 2049, S 2063, S 2066, S 2033, coat thickness 120 μm;

--polystyrene S 2850, coat thickness 120 μm;

--polyurethane U 2050, U 2051, coat thickness 110-130 μm.

Assessment applies only to samples exposed on open deck. Effective protection within closed casings, particularly boxes made of large-surface materials, was provided only by the following coating systems:

--oil O 2301, O 2302, coat thickness 120 to 140 μm;

--epoxy asphalt S 1390, S 2390, coat thickness 120-130 μm;

--asphalt 18--0011, coat thickness 130 to 150 μm.

Second Stage (3-Year Test)

After 2 years of exposure there was degradation of the following systems:

--epoxy S 2323, S 2321, coat thickness 110 μm;

--nitrocellulose C 2023, coat thickness 100 μm;

--synthetic S 2051, S 2013, S 2071, coat thickness 100-130 μm.

The following system withstood a 3-year exposure:

--polyurethane U 2000, U 2050, coat thickness 130 μm;

--synthetic S 2029, S 2049, coat thickness 120 to 180 μm.

The tests showed, in conformance with the first stage, favorable resistance of polyurethane and of some synthetic coating systems.

The third stage involved tests of latex coating systems and also anticorrosive, water-soluble, air-drying coating substances. The latex systems V 2012 and V 4005 (thickness 80-140 μm) began to lose their protective property after as few as 6-8 weeks of exposure. These systems are not suitable for climatically demanding conditions. Water-soluble coating substances 22-0577 and 22-0579 in a thickness of 140 μm are comparable to synthetic systems S 2013 and S 2029. The tests also verified the potential for replacing synthetic prime coatings S 2070 and S 2035 by epoxyester zinc-chromate coatings and/or by water-soluble anticorrosive coatings 27-0524.

Among primers, the only ones to qualify were S 2035 and 22-0577. Coating systems were subjected to assessment of their degree of deterioration, particularly any change in hue, chalking, powdering, subcorroding, blistering and corroding. Change in hue, chalking and powdering gradually occurred in all systems (except asphalt and latex). Longest resistance was shown by polyurethane, epoxy and synthetic (S 2029) systems in a thickness above 120 μm. Change in color hue was most pronounced in palette hues, except grey. Corrosion defects appeared in systems of up to 100 μm thick, first in nitrocellulose and polystyrene. It was confirmed that the protective function of a coating is directly dependent on its thickness, then on pigment and other qualitative components of the coating substance. The key factor for the length of service life of the entire coating system is surface finishing prior to coating.

2.2 Fluid Coatings (1, 2)

The following three types of fluidization materials were selected for testing:

--epoxy fluid, coat thickness 0.4-1.2 μm;

--PE fluid, coat thickness 0.6-1.4 μm;

--PVC fluid, coat thickness 0.4-1.4 μm.

Results of the exposure of samples show that fluid coatings are suitable for protection of materials only under certain conditions. Under ocean climate conditions there occurred gradual brittleness of the applied coating, cracking along edges of samples and peeling, particularly at thicknesses up to 1 μm. In coatings with thicknesses in excess of 1.5 μm these defects did not appear until the second year of testing. There occurred a loss of luster and of color shade of the coating. While in the first year of exposure fluid coatings showed a better protective resistance than the applied coating systems (particularly a minimum of corrosion defects), the rate of their degradation in the course of the second year was faster.

2.3 Electrolytically Deposited Metallic Coatings

In the first stage, steel samples with the following coatings were exposed:

--zinc, coat thickness 10-15 μm;

--cadmium, coat thickness 8-16 μm;

--nickel, coat thickness 5-40 μm.

Results of 1 year's exposure made it obvious that coatings Zn and Cd in a thickness up to 16 μm are unsuitable. Only nickel coatings of 30-40 μm thickness showed long-term service life.

In the second stage, samples with galvanic coatings combined with protective varnishes were tested:

--zinc, coat thickness 25-30 μm;

--cadmium, coat thickness 15-25-30 μm;

both types chromated and unchromated, protected by nitrolak C 1005 and synthetic varnish S 1300.

After 9 months' exposure, all samples showed evidence of surface changes, washed off passivation, the coatings cracked and peeled off in places and occurrence of corrosion products was determined in the coating metal. None of the samples was corroded through to the basic material. In comparison to Zn, Cd coatings showed a longer service life of the passivation layer and smaller occurrence of corrosion products. After 13 months of exposure all samples showed overall surface corrosion.

Consequently, in the third stage the previous types of galvanic coatings with thickness of 20-30-40-50 μm were used. Coatings of 40-50 μm thickness showed resistance comparable to that of the simultaneously exposed coating systems. Assessment showed that chromated zinc and cadmium coatings are more resistant than routine nickel coatings. In spite of the demonstrably limited service life of Zn and Cd coatings under oceanic climatic conditions, application of a baked-on zinc coating to link chains used for opening the lid mechanisms of the ship's holds in a thickness of 80-100 μm proved successful. This favorable result was due to higher thickness of coating.

3. Systems Providing Temporary Protection

3.1 Preservatives, Protective Papers and Foils (1-8)

The following were selected for testing:

--preservation vaselines C and LH;

--preserving oils OK 1, OK 40;

--removable varnish C 1802;

--preserving waxes KRNB, Ostramax;

--microcrystalline waxes TIMP 4Y, PLP 2Y;

--dipping preservation agents Tectyl T511, T506;

--papers and corrosion inhibitors SVIK 110, SVIK 95, Bran-O-Rost, Mikrotex B.

Mikrotex B is the only barrier material and is produced from pasted cardboard in combination with textile mull and impregnation with wax. The surface of Mikrotex B is provided with a layer of a contact corrosion inhibitor.

The test results are summarized in Table 1. Samples were tested in part on open deck, in part stored in boxes with openings and in boxes without openings (closed).

The tests showed that most of the preservation agents are capable of protecting metal for a period of only 6-12 months. The protective effects of double rewrapping with Mikrotex B became clearly apparent even during this period of exposure. Considerably better results were obtained with airtight foil wraps made of PE and PVC, whereby seepage and condensation of water inside

Table 1. Results of Assessment of the Protective Effectiveness of Basic Types of Preservation Agents

Preservation Agent (konzervační prostředek)		exposure 6 months (expozice 6 měsíců)						exposure 12 months (expozice 12 měsíců)					
		box (bedna)				panel		box (bedna)				panel	
		open (otevřená)		closed (uzavřená)				open (otevřená)		closed (uzavřená)			
		I	II	I	II	I	II	I	II	I	II	I	II
konzervační vazelina C	1	×	O	×	O	×	O	×	O	××	O	××	×
konzervační vazelina LH	1	O	O	O	O	O	O	×	O	×	O	×	O
konzervační olej OK 40	2	O	O	O	O	O	O	×	O	×	O	×	O
konzervační olej OK 1	2	×	O	×	O	××	O	××	×	××	×	××	×
konzervační vosk KRNB	3	O	O	O	O	O	O	×	O	×	O	×	O
Ostramax		O	O	O	O	O	O	×	O	×	O	×	×
MKV TIMP 4Y		O	O	O	O	O	O	O	O	O	O	O	O
MKV PLP 2Y		O	O	O	O	O	O	O	O	O	O	O	O
T 511		×	O	×	O	××	×	××	××	××	××	××	××
T 506		O	O	O	O	O	O	×	O	×	×	×	×
lak C 1802	4	O	O	O	O	O	O	×	O	O	O	×	O
papír SVIK 110	5	O	O	O	O	O	O	×	O	×	O	×	O
papír 95	5	O	O	O	O	O	O	×	O	×	O	×	O
papír Bran-o-Rost	5	O	O	O	O	O	O	×	O	×	O	×	O
Mikrotex B		O	O	O	O	×	O	×	O	×	O	×	O
bez ochrany	6	×	O	××	O	××	O		[7] koroze na celé ploše				

Preservation Agent (konzervační prostředek)		Exposure 24 months (expozice 24 měsíců)						Exposure 31 months (expozice 31 měsíců)					
konzervační vazelina C	1	××	×	××	××	×	××	vyřazen mimo Mikrotexu [8]					
konzervační vazelina LH	1	××	×	××	××	×	××	vyřazen mimo Mikrotexu [8]					
konzervační olej OK 40	2	××	×	××	×	××	××	vyřazen mimo Mikrotexu [8]					
konzervační olej OK 1	2		[9] koroze nad 50 %										
konzervační vosk KRNB	3	××	O	××	×	××	××	[9] koroze nad 50 % vyřazen mimo Mikrotexu [8]					
Ostramax		××	O	××	×	××	×	[9] koroze nad 50 %					
MKV TIMP 4Y		×	O	×	O	×	×	×	O	×	O	×	×
MKV PLP 2Y		×	×	×	×	O	×	×	O	×	O	×	×
T 511 (Tectyl)			[10] celkové podkorodování mimo Mikrotexu										
T 506 (Tectyl)			[9] koroze nad 30 %										
lak C 1802	4	×	O	××	O	×	O	×	×	×	×	×	×
papír SVIK 110	5	×	×	×	×	××	×	[9] koroze nad 30 %					
papír SVIK 95	5	×	×	×	×	×	×	××	××	××	××	××	××
papír Bran-o-Rost	5	××	×	××	×	××	××	[9] koroze nad 30 %					
Mikrotex B		××	O	××	O	×	O	××	×	××	×	××	O
bez ochrany proti korozi	11												

I--repacked with paper P 770 (2x)
II--repacked with Mikrotex B (2x)

x--corrosion covering 1-5 percent of area
xx--corrosion over 5-10 percent of area
o--without corrosion

Key:

1. Preserving vaseline
2. Preserving oil
3. Preserving wax
4. Varnish
5. Paper
6. Without protection
7. Entire surface corroded
8. Excluded except Mikrotex
9. Corrosion in excess of
10. Overall subcorrosion except Mikrotex
11. Without protection against corrosion

the wrap can be reduced by increasing the thickness of foil and decreasing the amount of unused space within the wrap.

In the next testing stage, Czechoslovak preservation agents were compared to the products of the Valvoline Co (designation Tectyl). Nine types of preserving agents were applied to steel plates and submitted to exposure in four variants:

--without rewrapping;

--with impregnated paper rewrap;

--with Mikrotex rewrap;

--rewrapped with PE foil of 0.1 μm thickness without sealing.

Resistance of the system to oceanic climate for a period of 9 months was assessed by the extent of mass defects in steel plates (Table 2). The ranking of preservation agents according to decreasing resistance is shown in Table 3.

The manner of assessment did not take into consideration the varying thickness of coating expressed by its weight in g.m^{-2}. Its consideration underlines the preserving properties of the Tectyl 846 agent.

Table 2. Summarized Results of Mass Defects In Steel Plates After 9 Months of Exposure (four varying wrapping systems in combination with nine types of preservation agents)

číslo A	konzervační prostředek B	nános [g.m^{-2}] C	holý [úbytek g.m^{-2}. r^{-1}] D	přebal. gačovaný papír [úbytek g.m^{-2}.r^{-1}] E	přebal. Mikrotex B [úbytek g.m^{-2}.r^{-1}] F	přebal. PE fólie [úbytek g.m^{-2}.r^{-1}] G
1	Resistin ML	36,8	265,2	9,76	2,6	13,16
2	Resistin CAR	66,1	58,68	8,12	4,17	16,2
3	KRNB	51,06	128,8	17,04	5,04	19,8
4	Konkor 103	10,1	1910,9	34,3	5,6	395,0
5	Tectyl 511 M	9,2	874,6	36,2	7,5	762,8
6	Tectyl 400 C	57,2	106,8	16,9	1,78	49,4
7	Tectyl 846	11,7	506,0	25,3	3,0	26,3
8	Tectyl 506	108,1	76,0	7,3	1,7	9,8
9	Vazelina C	45,2	702,2	18,3	5,5	78,5
10	bez konzervace	—	2338,1	35,5	6,76	471,6

Key:

A. Number
B. Preservation agent
C. Deposit
D. Bare (loss...)
E. Impregnated paper rewrap (loss...)
F. Mikrotex B rewrap (loss...)
G. PE foil rewrap (loss...)
9. Vaseline
10. No preservative

Table 3. Ranking of Preservation Agents According to Decreasing Resistivity

A číslo	B konzervace bez přebalu	C konzervace + přebal. gačovaný papír	D konzervace + přebal. Mikrotex	E konzervace + přebal fólie PE
1	Resistin CAR	Tectyl 506	Tectyl 506	Tectyl 506
2	Tectyl 506	Resistin CAR	Tectyl 400 C	Resistin ML
3	Tectyl 400 C	Resistin ML	Resistin ML	Resistin CAR
4	KRNB	Tectyl 400 C	Tectyl 846	KRNB
5	Resistin ML	KRNB	Resistin CAR	Tectyl 846
6	Tectyl 846	Vazelina C	KRNB	Tectyl 400 C
7	Vazelina C	Tectyl 846	Vazelina C	Vazelina C
8	Tectyl 511 M	Konkor 103	Konkor 103	Konkor 103
9	Konkor 103	bez konzervace	bez konzervace	bez konzervace
10	bez konzervace	Tectyl 511 M	Tectyl 511 M	Tectyl 511 M

Key:

A. Number
B. Preservation without rewrap
C. Preservation + impregnated paper rewrap
D. Preservation + Mikrotex rewrap
E. Preservation + PE foil rewrap

6C, 7D,E = Vaseline
9C,D,E, 10B = No preservative

The results showed that our preservatives are comparable to the best agents offered by the Valvoline Co and, also, that there are no substantial differences between the quality of protective properties of our wax-type preservatives Resistin ML, Resistin CAR and KRNB.

3.2 Wooden Crating (1-3)

Transportation cratings, partly all-wood, partly made of materials covering a large area (VPM)--plywood, were exposed to the effects of oceanic climate on open deck for 3 years. Determination was also made of the effectiveness of:

--ventilation ports (25 mm in diameter);

--surface finishing of boxes (synthetic primer S 2012 and synthetic enamel on top S 2013, latex for wood V 2013);

--inner lining (routinely used lining papers, unsanded cardboard, paper with blended corrosion inhibitor SVIK, barrier material Mikrotex B, laminated materials (Al foil + fabric + wax), PVC and PE foils.

Both all-wood and VPM transportation cratings showed very good stability as well as resistance in open air during the first year of testing. In the course of continued testing, there was visible degradation of the surface of boxes and, in regard to appearance, they lost their function as a quality transportation crating. Finishing of boxes with synthetic and latex coating systems proved effective only up to approximately 18 months of testing. Subsequently, there was peeling of synthetic coatings and, later, of latex coatings as well. In the case of plywood cratings, in the third year there appeared fine surface cracks which, however, did not propagate to a greater depth. Coloring of the surface reached an unsightly grey-black shade, connecting nails of the crating became corroded, nail heads fell off and the crating became somewhat loose. However, all in all, the boxed did withstand transportation to the CSSR.

As regards the microclimate in the interior space of the crating, it was much more aggressive in cratings made of VPM and lining of walls with high-quality packaging materials (in this type of transportation casings) was an absolute necessity. The ventilation ports proved their significance in both types of transport cratings, particularly during storage in open air. Boxes with ventilation ports showed less damage to packaging materials and attacks by corrosion were lesser in extent than in boxes without ventilation ports. The most effective liner for boxes proved to be the barrier material Mikrotex B and a combination of paper SVIK + PVC or PE foil. Routinely used lining papers prevented corrosion only for the first 3 months of exposure.

3.3 Containers (9)

In verification of the corrosive effects of the microclimate of containers and optimization of the systems for temporary protection of products transported and stored in containers, one of the selected climatic variants was exposure of a container of the ISO-1C series on the deck of an oceangoing ship for 1 year.

The total distance covered by the ship was 100,000 km. The objects selected for testing were samples of steel classes 11 and 17, copper, brass, aluminum, duraluminum and zinc. Tests were also made of the protective efficiency of preservation agents (Resistin ML, Konkor 101, Konkor 103, Revax 30, Kortan 80, motor oil M6 AD) and packaging materials (papers with corrosion inhibitor SVIK + PE, Multikor S and Multikor SC).

The test results showed that aggressivity of the medium in a container can be classified according to CSN [Czechoslovak State Norm] 03 8203 as Degree 2, i.e., very moderate. Even on unprotected surfaces there is only negligible corrosion. For that reason, Western companies transport parts entirely unprotected in container shipping lasting less than 3 months. It turned out that containers substantially reduce the effects of the external environment on the stored material. Preservatives Resistin ML and Revax 30 offer adequate long-term and complete protection against corrosion of materials in a container.

Preservation by Konkor 101, Konkor 103 and Kortan 80 preparations must be combined with rewrapping. The most suitable material for wrapping unprotected metallic materials is Multikor S which offers excellent protection even when the wrap becomes slightly damaged. Thus, in addition to providing better protection for transported goods against destruction, displacement or loss, a container considerably reduces the demands on temporary protection against corrosion.

4. Plastics

4.1 Thermoplastics (1-3, 10)

Testing in the first stage after a 3-year exposure involved changes in the mechanical properties of the following samples (tearings):

--polyamide (Rilsan ZM, Durethan BKV, Maranyl A 190, Silamid, Grilon, Ultramid A 4 H);

--polyformaldehyde (Hostaform C, Delrin);

--polycarbonate (Makrolon);

--ABS (Urtal, Cycolac, Sycoflex);

--polystyrene (Krasten, Styraflex, Styrafil).

Assessment included tensile strength, ductility and impact resistance. Values of mechanical properties, in excess of 80 percent of their initial level, were retained only by polyamides Durethan and Grilon, polycarbonate Makrolon, polystyrene Styrafil and ABS of the Cycolac type. The surface of all types of thermoplastics showed a change in color shade, loss of luster and fine cracks.

In the next stage a 1-year exposure aboard ship was used to check the stability of the mechanical properties of domestically developed types of polyphenylenoxide in comparison to the Noryl type of General Electric. Original values of mechanical properties were retained, together with their foreign equivalent, by those domestic types which contained an addition of ethylenpropylene rubber.

4.2 Thermosetting Plastics (1-3, 8)

Test samples subjected to 3 years of exposure were made of the following:

--molding materials 135, 151, 152;

--Premix 1100, 1200, 1200 P;

--Epodur 1000, 1500, 2000.

Original values of bending strength and impact resistance were retained by Premix 1200 and 1200 P and by Epodur 1000 and 2000.

Conclusion

The results of climatic tests on the high seas significantly influenced the development of new technologies for internal and transport packaging and systems for temporary and permanent protection. Their demonstrable validity favorably affected introduction of those technologies in the plants of the CKD Prague VHJ [economic production unit]. The findings obtained expanded the knowledge of researchers and of shipping personnel in regard to the types of damage sustained by goods during oversea transportation, during loading and unloading in ports. They made a substantial contribution to successful handling of shipments of complex systems and complete industrial plants overseas and to countries with adverse climatic conditions. They allowed for expedient orientation in new types of systems offering temporary and permanent protection, selection of types of plastics with adequately stabile properties for use in CKD machinery and electrotechnical production.

Of importance is also the fact that determination was made of the protective efficiency of preserving and packaging materials, the service life of coating systems, galvanic coatings and plastics of domestic and foreign production.

The export tasks of the Czechoslovak machine industry and of VHJ, to include CKD Prague, call for devoting attention in dealing with problems of operational reliability of products also from the viewpoint of their protection against corrosion. This indicator applies particularly to deliveries into areas with adverse climatic conditions, where the quality and reliability of products is directly dependent on suitably selected protection against corrosion.

In view of the fact that there is an unceasing development of new types of coating substances, preserving and packaging materials, it is imperative to know their qualitative properties. Developmental materials cannot be identified and used without systematic tests. For that reason, it is imperative to keep on intensively checking the protective functions of new materials and implementing the results immediately into practice. From the viewpoint of economy, tests on oceangoing ships require only 20-30 percent of the amount of cargo that would be required for equivalent laboratory testing sets.

8204
CSO: 2402/42

AGRICULTURAL AVIATION DEVELOPMENTS DESCRIBED

Prague MECHANIZACE ZEMEDELSTVI in Czech No 4, 1983 pp 147-149

[Article by Eng Miloslav Stepan, Institute for Scientific System of Management, Prague: "Technological Development of the Aircraft Fleet for Agricultural Operations"]

[Text] Aviation is the supreme form of application of technology in agriculture. It forms a viable link in the organization of agricultural mass-production. The high performance of aviation technology as well as the technical capability for carrying out agricultural aviation operations with high efficiency slate aviation for continued and wider future applications in the CSSR.

Organized aviation-chemistry operations on the territory of the CSSR have a tradition dating back more than 30 years. In their development, they attained a considerable growth in the volume of performance and intensity of activities. The performance level attained by SLOV-AIR in agricultural aviation operations in 1981 in the CSSR was 3,590,194 hectares and 5,289,449 average hectares. Each hectare of agricultural acreage in the socialist sector accounted for 0.53 applications of agricultural aviation operations.

Annual performance per aircraft is on a steadily increasing trend affected by, in addition to improved quality of organization of air operations, by the technological and performance features of new aircraft types incorporated into the fleet.

According to data from abroad, assessment of the ideal features of an aircraft for agricultural operations showed an aircraft with a container holding 600-800 kg to be optimal for most applications of chemical substances overall and deviations from this figure for varying extent of acreage were low. Operational width of coverage is of particular importance when it involves small amounts. The width of operational coverage in the use of aerosol should not be less than 30-40 m. Use of granulated fertilizer and water spraying calls for a minimum width of operational coverage of 20 to 25 m. All of these requirements are met by the Z-37 Cmelak [Bumblebee] aircraft.

Particular attention was paid in the case of this aircraft to the concept of the applicatory equipment, which includes a series of new design elements promoting a substantial improvement of output characteristics as compared to the L-60 type (Table 1). Applicatory equipment is driven mechanically from the aircraft's engine. The volume of the container for chemicals is 670 l. Loose fertilizers slide from the container into the feed-hopper onto the rotary dispensing disk which can be adjusted to control the amount of loose substances scattered from the distribution spreader per second. The rotary distribution spreader constituted a technological novelty awarded a Czechoslovak patent. The scattering wing added to the distribution spreader for dusting makes it possible to double the width of operational coverage in comparison to the L-60 aircraft. The spraying attachment with water jets is designed for spraying water dispersions for protection of agricultural crops or for additive fertilization on foliage. Oil jets serve for scattering of oil dispersions, emulsions for treatment of agricultural crops and forest growth in small amounts.

In addition to Czechoslovak aircraft types, continuous application is found in our country for the AN-2 aircraft of Soviet manufacture. Its payload is 1,200 kg of chemicals, height of the filling port 4 m. Filling of the container with chemicals is handled by a pressurized tank. Use of the aircraft is more demanding on takeoff and landing runways and on organization of operations with the requisite technological equipment. In view of the higher operational costs, maximum operational use and payload connected with good organization of operations is of importance. Labor productivity is less favorable in view of the overall need for working time in relation to performance per area unit.

Together with changes in aircraft fleet, there has been a gradual change in the structure of air operations for agriculture. In the initial stages of their development, plant protection constituted the basic scope of air operations while aerial fertilizing was a supplementary activity to achieve a higher annual utilization of aircraft. In the course of further development and more intensive fertilization by industrial fertilizers, the numbers of aircraft and the share of fertilizing in aviation chemistry kept increasing.

The extent of aerial fertilizing registered a marked increase, particularly during the fifth and sixth 5-year plans. Aerial fertilizing by nonpressurized liquid industrial fertilizers has been finding wider application over the past several years and increased use has also been made of aircraft for aerial sowing of cereals (wheat, barley) and fine-grained oleaginous plants (winter rape seed, mustard seed) and for desiccation of plants.

The ratio in the share of plant protection in relation to plant feeding reversed itself over the past 20 years, yet productivity of aerial plant protection in hectare acreage shows a 2.6-fold increase.

Improved choice in available types of aerial operations has also been accompanied by specialization within the aircraft fleet toward certain types of operations and an increasing use of helicopters. Tests were conducted in 1957 with Mi-1 military helicopters equipped with a spraying system. Manned by military crews, they achieved in 4 hours of productive labor an output of 60 hectares in plant spraying and 40 hectares in application of industrial fertilizers. As of 1975, the CSSR used Mi-2 helicopters with a higher cruising (160 km/h) and operational speed (up to 105 km/h), volume of chemicals (600 l) and width of operational coverage during spraying (25 m).

Table 1. Technical and Performance Specifications of Czechoslovak Aircraft Used in Agricultural Operations

Indicators	Aircraft Type L-60	Z-37	Z-37 T
Operational speed [km/h]	120	120	145-165
Payload [kg]	350	600	950
Granule distribution:			
Amount [kg/s]	max. 10	2-20	2-35
Width of operational coverage [m]	14	30	(40)30
Dusting:			
Amount [kg/s]	max. 1.5	0.7-8	0.5-2
Width of operational coverage [m]	20	40	(35)25
Spraying of aqueous solutions:			
Predominant size of particles [μm]	100-500	100-500	100-500
Amount [l/s]	max. 10	2-12	2.4-18
Width of operational coverage [m]	max. 16	max. 25	(50)25
Spraying of oleaginous solutions:			
Predominant size of particles [μm]	50-120	40-120	40-120
Amount [l/s]	max. 2	0.3-2.4	0.1-4.2
Width of operational coverage [m]	20	35	(60)40

Helicopters produce two main vortex swirls in the same way as an aircraft and with the same direction of rotation. Looking from behind, the left swirl has an air current moving clockwise, the right swirl in the opposite direction. These vortices make it possible to achieve operational coverage wider than the wingspan or rotor diameter. They produce a fine spray. Reduction in speed causes an increase in the vortex pointing toward the ground and in the size of terminal vortices. The turbulent region, which forms the main rims of air current near the ground, forms approximately half the size of rotor diameter. Quality of operation with the use of a helicopter is improved by rotary atomizers which form droplets of uniform size. Mi-2 helicopters are used by SLOV-AIR in aviation chemistry operations only for spraying for plant protection and for fertilizing with industrial fertilizers. In view of the advantages offered by helicopters in effectiveness of spraying, their application will increase in the coming years, even though the performance of the Mi-2 helicopter in comparison with the Z-37 aircraft shows a ratio of 55:100 and the cost of their operation is triple.

According to the findings of the UVSH [Institute for Application of Science in Agriculture] in the CSR, the extent of aerial operations for agriculture can be potentially increased in the future in relation to the extent of limiting factors (hygienic protection zones, extent of acreage, terrain obstacles, configuration of the terrain) in area and by increasing the intensity of aerial operations to the upper limit of approximately 4 million hectares, i.e., by a maximum 70 percent. The actual long-term application of aerial operations on behalf of agriculture depends to a considerable extent on regulation of supply-demand relations, to include price relations for aviation services for agriculture.

Selection of the new carrier type of aircraft to replace the Z-37 Cmelak type was based on the assortment of new types in Poland which was delegated the responsibility for producing agricultural aircraft for CEMA countries:

PZL 106--monoplane, single-seat cockpit located behind container. Chemical tank volume 1,400 liters, operational speed 120-160 km/h. In the case of the PZL 106 A type, equipped with PZL-3S piston engine, poor working conditions, defects in the engine and a shortage of replacement parts were encountered. The PZL 106 B type has a new wing design and it is envisioned that its flight properties will be improved and its fuel consumption reduced.

PZL M-18 Dromader--monoplane, container ahead of cockpit, equipped with a conventional radial engine. Volume of tank for chemicals 2,500 l, operational speed 170-185 km/h. It has been undergoing flight tests in our country since 1981. If the test results are favorable, the prices acceptable and logistical support available, this type could receive consideration for supplementing the aircraft fleet in the Seventh 5-Year Plan.

In view of the situation attendant to the offer of Polish aircraft, the CSSR Government stipulated in its Resolution No 329/81 of 26 November 1981 investigation of the possibility for reviving production of agricultural aircraft in the CSSR. With a view to the new orientation toward turboprop aircraft for agricultural purposes, it is envisioned to start developing the Z-37 aircraft with a turboprop engine also in our country. Until completion of the development and testing of the Z-37 T aircraft, it is envisioned to produce 40 units of the existing Z-37 aircraft in 1984 and 1985.

A technoeconomic study was worked out for development of the Z-37 Turbo aircraft. The materials used in production will be either of domestic origin or from CEMA countries. Key design assemblies have been taken over from the Z-37 aircraft. The power unit is a modified M 601 B engine with output reduced to 360 kW and a modified three-blade AVIA VJ 508 propeller. Volume of the tank for chemicals is 950 l (weight 800 kg); it is located behind the pilot and beyond it is a rumble seat for a mechanic, with the possibility of using this space for transporting cargo. Its applicatory equipment is a redesign of that from the Z-37 A aircraft; its technical specifications are shown in Table 2. The spraying mechanism, based on the spraying system of the M 75-1000 type, is designed for aerial spraying (with jets for fine spraying and atomization) as well as for firefighting. Its rotary distributor is based on the distribution mechanism of the M 64-1100 type, its rotary diffuser comes from the diffusion mechanism for scattering loose substances and seeds of the PZL-106 A aircraft. Incorporation of a turboprop engine into the frame of the conventional aircraft is expected to increase its operational speed and performance and reduce consumption of fuel.

In view of the economy measures applied to the fuel and energy situation, a significant criterion for development of aerial operations in agriculture will be consumption of aviation fuels. Consumption limits are set for both ground and flight activities, be it diesel oil for operations on the ground,

Table 2. Technical Specifications for Spraying and Dusting Systems of the Z-37 T Aircraft

1 Údaj	2 Typ letadla: Z-37 A		Z-37 T		3 Požadavek FMD na nový typ	
4 *A. Postřikovací zařízení:*	5 Postřik	6 Zmlžení	5 Postřik	6 Zmlžení	5 Postřik	6 Zmlžení
7 Pracovní rychlost letu						
8 — minimální [km.h–1]	120	120	124	145	130	130
9 — maximální [km.h–1]	—	—	165	165		160
10 Šířka záběru						
11 — absolutní [m]	50	60	50	60		
12 — efektivní [m]	20	35	25	40	30	40

1 Údaj	Z-37 A			Z-37 T				Požadavek FMD na nový typ			
13 *B. Rozmetací zařízení:*	14 Gra-nule	15 Krys-taly	16 Prach	14 Gra-nule	15 Krystaly	16 Prach	17 Se-mena	14 Gra-nule	15 Krys taly	16 Prach	17 Se-mena
18 Výška pracovního letu [m]	15—20	15—20	5	15—20	15—20	5—10	5—10	do 20	do 20	do 20	5—10
7 Pracovní rychlost letu [km.h–1]		120			145—165					130—160	
10 Šířka záběru											
11 — absolutní [m]	35	35	35	40	35	35					
12 — efektivní [m]	25	20	25	30	25	25	18				
19 — pracovní [m]	8—25	8—20	20—25	8—30	8—25	20—25	8—18	30	30	30	20

Key:

1. Item
2. Aircraft type
3. Req. of Min. of Transp. on new type
4. Spraying equipment
5. Spraying
6. Atomization
7. Operational flight speed
8. Minimum
9. Maximum
10. Width of coverage
11. Absolute
12. Effective
13. Scattering equipment
14. Granules
15. Crystals
16. Dust
17. Seeds
18. Operational flight altitude
19. Operational

or gasoline or petroleum for operations in the air. The UVSH conducted a survey of consumption of fuels in air and ground applications. The actual and rated consumption of aviation fuels (LPH), comparison of the demands on energy (Table 3) in consumption of fuels per hectare favor ground applications and the costs for fuel consumption also coincide with the index relation:

Item	Ground application D-032	Aerial application Z-37	AN-2	Mi-2
Fuel consumption	100	210	420	930
Costs	100	108	294	527

Table 3. Comparison of Fuel Consumption and Costs for Ground and Air Applications

1 Aplikace	2 Typ	3 Pracovní postup	4 Pracovní záběr [m]	5 Druh pohonné látky	6 Spotřeba na 1 letovou hodinu [l]	7 Spotřeba na 1 ha [l]	8 Cena za 1 l [Kčs]	9 Celkem cena na 1 ha [Kčs]	10 Index
Pozemní [11]	D—032	přímý [12]	12	nafta motorová [13]		1,0	4,00	4,00	100
		dělený [14]	12	nafta motorová		0,9	4,00	3,60	
	Kertitox Goliat	přímý [12]	18	nafta motorová		0,8	4,00	3,20	
		dělený [14]	18	nafta motorová		0,55	4,00	2,20	
	PAG	přímý [12]		nafta motorová		0,85	4,00	3,40	
		dělený [14]		nafta motorová		0,75	4,00	3,00	
Letecká [15]	Z—37		25—40	[16] benzín letecký 78		2,1	1,825	3,83	
				[17] olej ELF AD 100	0,95	0,02	24,310	0,49	
				celkem				4,32	108
	AN—2			[16] benzín letecký 95		4,2	2,049	8,61	
				[17] olej ELF AD 100	6,00	0,13	24,310	3,16	
				[18] celkem				11,77	294
	Mi—2			[19] petrolej					
				[20] letecký PL—6		9,3	1,833	17,05	
				[21] olej B 3V	0,60	0,02	201,150	4,02	
				[18] celkem				21,07	527

Key:

1. Application
2. Type
3. Mode of operation
4. Width of coverage
5. Type of fuel
6. Consumption per flight hour
7. Consumption per hectare
8. Price per liter
9. Total price per hectare
10. Index
11. Ground
12. Direct
13. Diesel oil
14. Separate
15. Air
16. Aviation gasoline
17. Oil
18. Total
19. Petroleum
20. Aviation
21. Oil

Expressing the price in monetary terms must take into consideration the fact that aviation fuels, other than oil, are procured at wholesale, i.e., lower prices. Specification of savings ratios in limits on consumption of fuels between air and ground operations will affect further development of aviation services for agriculture.

In addition to increased scope of aviation support for agriculture, the unresolved problem in the concept of the Eighth 5-Year Plan remains selection of the carrier type of aircraft to replace the Z-37 aircraft. It is estimated that by the end of the Eighth 5-Year Plan the new type will include 150-170 units. In the same period must be carried out renovation of Mi-2 helicopters with eventual introduction of a new helicopter of the Ka-126 type to replace the Ka-26.

For the immediate future, it appears imperative to find a solution to all the unresolved problems of aircraft fleet development in connection with implementation of the concept for the ground base with optimizing the distribution and construction of airports for aviation operations in agriculture.

8204
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CEVAMIT--NONEXPLOSIVE DEMOLITION AGENT INVENTED

Bratislava SMENA in Slovak 25 Apr 83 p 3

[Article by Dusan Krajcik: "Archimedes Died a Long Time Ago"]

[Excerpts] Cevamit

To use a language of concise supply terminology, Cevamit is a dry non-explosive mixture made from domestic raw materials, earmarked for disjoining rocks, concrete, and reinforced concrete without explosions. It is introduced into a material in the same way an explosive is introduced, that is, in vertical, slanting or horizontal drill wells. Cevamit was developed by the Research and Development Institute for Mortar Materials k.u.o. Trencin, and is to be put on the domestic market by CEVA Trencin in 1984. Its inventors are Ing Marian Miazdra, CSc., and Ing Julius Siska. In this case, the time lapse since the beginning of the research until the Archimedean eureka was a little over 1 year, and in no way can the result be ascribed to an accident.

"The first time we came across something like that was in a bid of the Japanese Sumitomo-Cement Co. Licensed production was not considered, because the Japanese refused to sell the license, and the price of the produce, $3,500 per ton, was prohibitive. These were the basic reasons why we started to develop a product of our own," comments Ing Miazdra. "One of its few disadvantages is the fact that is is effective after 3 to 24 hours, and in extreme conditions up to 48 hours. On the other hand, however, it has a great deal of outstanding advantages. It can be used in all places where the use of explosives is out of the question, such as for reconstruction of plants under full operation, because there is no danger of damaging other equipment. As a final result of the broadcast special on our Cevamit even such parties showed interest in it to whom we originally had not even sent questionnaires, for instance Nova Huta Klementa Gottwalda [New Klement Gottwald Metallurgical Works] in Ostrava."

Cevamit is also employed in mines where it is not possible to use conventional explosives due to the presence of gases, or on construction sites close to utility networks. There is no pressure wave when using Cevamit, no flying fragments and a reduced amount of debris. In comparison with foreign products, its tenfold lower price is the most persuasive factor.

Stonecutting no doubt still possesses a certain romantic charm, but he who is more closely acquainted with this kind of work, knows that it is above all immense drugery. Huge blocks can be made smaller by means of a conventional explosive, but there is always some risk involved. An explosive works in its own way, managing often to ruin a whole piece of precious material. Then there is still another possibility. Hammers and wedges. This is a technology taken over by Michelangelo from his ancestors. Today the next possibility is being offered automatically: Cevamit. It works reliably, the breakage line can be precisely marked, the debris is minimal.

"All things considered," continues Ing Miazdra, "Cevamit works on a principle similar to [the action of] frozen water. However, it expands about 11 percent--with Cevamit it is almost 40 percent...

"Moreover, in our conditions it is hardly possible to rely on frost all the year round..."

The formula is very simple, so much so that Ing Miazdra did not even mention it lest the production secret might be revealed. However, this statement may raise a question. Why so much "ado" when there is nothing earthshaking involved? Let us stay with Archimedes, since we began with him. His principle is nothing extraordinarily complex either. Nonetheless, there is one little thing which is essential: it was nobody else but he who discovered it.

"As I mentioned before, there was no real feasibility for licensed production, and also the price of the offered product was far from reality for us. Even if the Japanese had agreed to licensed production, although they rejected it on principle, we would have been obliged to establish quite a new technology for their product, not used in this country hitherto. That would have represented another, far from negligible, claim on hard currency. Cevamit can be produced in our equipment, slightly enlarged, and from domestic raw materials as well. Perhaps the only hard-currency demand involves the wrapping device, which is not manufactured in this country, and permits packing Cevamit into polyethylene wrappings. The thing is, that when in use, Cevamit has to be mixed with water. If it got in contact with water before usage, let us say during transportation, the result would be its depreciation."

One can identify with this obliquely expressed distruct of the technical furnishings of our transport. Blasting of hardened wet cement and other materials out of railway carriages is less rare than the availability of a sufficient amount of windshield wipers for MB Skodas...

Opportunities Come Only to Those Who Work Hard

At the beginning they had two Japanese, one U.S. and one Canadian patent at their disposal. They tested all types of mixtures on a small scale. Not to get it wrong, what was involved here was really only to limit the space in which to search. In none of its properties is Cevamit similar to foreign mixtures. However, its effectiveness is of equal value. It is not enough to know where to search--the applied research is also tightly bound by commercial and economic requirements, by production feasibility; it has to get into certain price relations. The guideline for elaborating an introductory technical-economic study specifies what such a study has to contain, namely: a statement of the social need for a solution; justification of a prerequisite safeguarding by the Czechoslovak development; possibilities of collaboration with socialist countries; possibilities of license assurance; a proposal for technical-economic parameters, standards and price features; a proposed preliminary price; means of investment; and analysis of future use. At a first sight, a layman could consider this simply as something like palm reading, but Ing Miazdra refused such an opinion, smiling. He mentioned only, as if apropos, that to a considerable extent these things were also a matter of experience and routine. A technical-economic study has to be approved by a board of opponents--in the worse case, if it is not approved, there have been several months of work wasted--and only then can the research per se begin.

Finally, from hundreds of laboratory tests five were selected to be continued in pilot plant conditions. The first stage took about 2 months, the second considerably more. What followed were tests in various plants. Hours, days, weeks--all of them with a risk that one "puts one's foot in it," and the whole job may be in vain. And then be responsible for the expenses!

"But this is the kind of work one can really enjoy, seeing that he has left something behind. At the end, we had two modifications in our hands: a summer modification and a winter one. The summer one would not react in winter, and vice versa--the winter one would induce too stormy a reaction in summer. It would blow out of a drill well. For instance, we have tested the summer modification in the Cierny Vah repumping water power station. The result: beautiful passages into reinforced concrete walls of conductors, where a conventional blast could have damaged the builtin equipment. And this was already at a time of nocturnal frosts..."

Last year experiments with 8 tons of Cevamit were carried out in various plants in a wide range of materials. New and newer possibilities were revealed, but Cevamit displayed also new, unexpected properties. It has been discovered that with Cevamit there is no problem in the strength of a material, but in its toughness. For instance, the strength of concrete is four times lower than that of volcanic rocks--those were bursting most delightfully due to their fragility--but in spite of this concrete needs substantially stronger charges. The thing is, it behaves like a sponge, providing enough possibilities for energy to escape. Moreover, the steel reinforcement which enhances its cohesion, has to be subsequently cut by blowtorch.

There were tens of experiments. For neither of the inventors was this a novel experience, and they knew too well that the first failure, such as might be one caused by a trivial error in mixing the blend with water, could also frighten away customers. That was why they were present at many operations, although it meant a great time burden for them. Today the situation is different. A successful Cevamit operation in the Slovensky priemysel kamena [The Slovak Stone Industry] in Levice, in existence for over a year now, Cierny Vah, or stone quarries are the pest propagation signs. Recently, for instance, there was interest displayed also by Silnice Brno [Brno Highways] who needed to build a closing slope at a highway construction in a builtup region. Next: a few days ago Cevamit helped to form a dilatation joint in excavating a ditch at the courtyard of the Bojnice Castle. And in places like that the use of explosives is very controversial, unless the aim is to move the historical monument to a different locality...

They Do Not Have a Bed of Roses

It is hardly possible to find who was the author of this lofty saying, but one thing is certain. He has forgotten that roses, even the most beautiful ones, have thorns. To a considerable extent, the institute depends on relations with suppliers, and from the point of view of the volume of supplies, research is an uninteresting partner. Moreover, due to the nature of their work, the researchers do not come up with their demands before the producers have closed their plans. All of this makes the implementation harder. In spite of that, the completion of a research task rarely takes more than 2 years. In addition, even in this situation people in research manage to keep its economic effectiveness. There is a return of three crowns for one crown invested into research.

> None of this had to be known by Archimedes, the genial child of his time who worked mostly from a desire for knowledge.
>
> There certainly exists a division of inventions into great ones, smaller ones, or tiny ones. But all of them have something in common. They have advanced the knowledge of mankind a great deal, and even the "tiny ones" try to make the stay of human beings on the blue planet easier and more pleasant.

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POLAR RESEARCH, EXPEDITIONS DESCRIBED

Polar Research Plans

Warsaw NAUKA POLSKA in Polish No 3 Mar 82, pp 119-122

[Article by Stanislaw Rakusa-Suszczewski: "Polar Research in the Country's Present Situation"]

[Text] The program of polar research carried out in the years 1978-1981 and planned for the next 5-year period should be viewed in the context of the motives and actions for which an initiative was provided among biologists and Department II of PAN [Polish Academy of Sciences] in the years 1975-1976. As a result of the increasing difficulties in this period with the Polish fishing industry, which were also associated with the fact of the ownership of the fishing grounds located in the traditionally exploited areas, the biologists' proposals for going after the live resources occurring in the region of the Antarctic obtained the support of PAN and governmental authorities, and aroused the interest of fishing enterprises.

The first maritime expedition to the Antarctic organized by PAN and MIR [Maritime Fisheries Institute] on the "Professor Siedlecki" and "Tazar," which was financed by PAN in 1975-1976, in addition to the interesting results of research of a scientific nature, provided a basis for surveying the possibilities of exploiting krill and fish in Antarctic areas. A year later, as a result of fishing results and the appearance on the national market of considerable quantities of fish from that region, caught by the fishing fleet sent there, the government, recognizing the fact of the concrete economic benefits that the country obtained from fishing in the Antarctic (100,000 tons in the 1977-78 season), adopted a resolution on the development of polar research, allocating PAN funds from the state budget for the purposes of establishing a research station in the Antarctic and creating interministerial research problem MR-II-16, the coordinator for which was PAN's Institute of Ecology. It is worth emphasizing that these outlays were returned many times over from the profits obtained from the fishing fleet's catch. By 1982 Polish fishing in the Antarctic reached 300,000 tons of fish. Activities aimed at creating our own station and developing polar research were necessary to Poland to obtain certain benefits of a political nature, resulting from the special status of the Antarctic. Due to the establishment of the H. Arctowski Station, Poland was included in the narrow circle of the 13 countries who are signatories of the Antarctic Pact, in which the USSR is the other socialist country. Poland also joined the Scientific Committee for Antarctic Research

(SCAR). At the same time, our country, as one of the three (together with the USSR and Japan) that exploited the live resources of the Antarctic in 1977-1979, became vitally interested in creating principles for rational exploitation of the Antarctic's live resources and in establishing an international convention to protect them. This was possible due to the performance of our own biological research, the training of specialists, and the results obtained, which were presented in an international forum and provided a basis for many formulations, both legal and scientific, in the convention that was prepared. It has also been actively involved in work in the forum of SCAR, a body which as the scientific body of the Antarctic Pact, draws up suggestions for it on the subjects of international policy, scientific cooperation, protection, and the possibilities for rational utilization of the Antarctic area.

In Poland, in the years 1975-1980 Antarctic research became a major incentive for several institutions, both with respect to organizing expeditions, and performing research under maritime and polar conditions. For the first time in 35 years, oceanobiological research was underaken, with PAN and MNSzWIT [Ministry of Science, Higher Education, and Technology] workers participating in it. This discipline, in spite of the considerable development of the fishing fleet, had not progressed in Poland for a long time as a result of a lack of technical and organizational possibilities, and what is most important, as a result of the lack of a clear concept for the research and the lack of a cadre of specialists, who did not have an opportunity to work outside the Baltic. This emergence into "the ocean," which was undoubtedly difficult in its initial phase, have yielded results in the form of the training of many specialists, maritime biologists and ecologists, whose doctoral and habilitatus studies allow nourishing hopes of a further development of this field in Poland. It is worth emphasizing that this initiatve came from deep inside the country, from the polar researchers. In addition to PAN and its coordination plan MR-II-16, work has been performed on a broad scale on governmental problem PR-4 and PRK, coordinated by MIR. This research was mainly directed toward the subjects of fishing techniques and technology for processing new unconventional resources, such as krill and cephalopods, and Antarctic fish. Research on the utilization of krill products has been extensively developed. During the past period, the specific political situation and the concealment of the results of this research led to a general misinformation of society, which has been a serious hindrance for opinions on the actual state and prospects for the utilization of this crustacean. In spite of the organizational and economic failures in the exploitation of krill, one must emphasize the enormous progress in research on its utilization, which is a useful scientific result from the last few years in many institutions in Poland.

Simultaneously with the development of biological research and due to the possibilities created by the biologists' initiative, several other types of research have been developed in scientific disciplines on the land, accompanying the biologists' work and providing a basis for comprehensive research on polar ecosystems. A particular role has been played by geological-geographic and cartographic work, the utilization of satellite photographs and multispectral photography equipment, hydrochemical and hydrological research, and biogeochemical research. The specific nature of

Polish polar research in the Antarctic was a comprehensive undertaking, the purpose of which was to understand the functioning of the ecosystem of the coastal zone and the pelagic zone. Research in the coastal zone has been and is being performed mainly in the region of the H. Arctowski Station above Admiralty Bay, which is a perfect research field. The work conducted there over a period of many years allows keeping track of long-term changes and trends in production, and is of a biological monitoring nature that is important for keeping track of the intensive exploitation of whales in the past and the intensive exploitation of fish and krill at present. It should be noted that these resources were not known to us at all, and world knowledge of them is still very poor. The work in the Arctowski Station region has yielded several interesting scientific results. Photographic studies have been made on various scales of the Admiralty Bay area and the ice surrounding it over an area of 300 square kilometers, and on the basis of aerial photography and detailed research on the ice and in the water, two physiographic maps have been made in the scales of 1:50,000 and 1:25,000, which contain information on the subject of the distribution and numbers of plant organisms on the ice and water (macroalgae) and of animal organisms (the zones of flocks of penguins and sea mammals). Hydrological conditions in the bay, which form the basis for biological processes, have been studied over an annual cycle. Several physical phenomena governing the circulaton of matter between the ice and water in the field of investigation were studied. The species and quantitative composition of bacteria, phyto- and zooplankton, fish, and cephalopods was investigated, with krill biology particularly taken into account. Many of these observations were conducted over an annual cycle. The groupings and distribution of the fauna on the bottom of the bay were distinguished, with particular consideration of the role of necrophagous species. Sea birds and mammals were the objects of research on the ice. A couple of years' observations allowed noting enormous fluctuations in the numbers of birds and mammals, and the rebuilding of the sea lion herds that were destroyed in the 19th century. Due to the determination of the size of the krill biomass in the bay and the numbers of its penguin and mammal consumers on the ice, an estimate was made of the amount of organic matter carried from the water to the shore, and it was established that the production in the bay is insufficient to feed the birds and mammals occurring there, which utilize resources beyond the area of the water of the bay.

Several processes were distinguished in the decomposition of organic matter in the water and on the ice. The entirety of the research provided a picture of the functioning of the coastal zone, a typical fragment of the Antarctic ecosystem.

As a result of the research performed at the station, technological solutions were provided or suggested for the utilization of the raw materials and live resources of the Antarctic. These results include the study of fluorine in the krill, and its localization and concentration; this is responsible for negative results in feeding animals. The presence of prostaglandin was discovered in the krill, and it was established that it may be the source of compounds of value to the pharmaceutical industry. Technologies were also developed and patented for obtaining taurocholic acid from the bile of Antarctic fish. Studies and experts' reports were made on the possibilities for utilizing

Antarctic seals; under the existing convention, up to 200,000 per year can be caught.

The other direction of research was work in the open ocean, aimed at reaching an understanding of the functioning of the ecosystem of the pelagic zone. It was begun in the 1975-6 season. Since 1981, the work has been closely associated wih the international research of the BIOMASS program, the purpose of which is to determine the amounts of live resources, and especially of krill, as the key organism in the ecosystem of Antarctica. There were 17 vessels from 10 states, including Poland, participating in the BIOMASS program's research in 1981. This is the largest world program for oceanobiological research. The results of this research will be processed jointly, and an exchange of the results is stipulated by several mutual international obligations. The Data Center in Hamburg has been appointed for this purpose. This work is to serve only for scientific knowledge, but in practice it will provide a basis for the international Convention on Protecting the Live Resources of the Antarctic, which adopts decisions on the rational use, limits, regions, and amounts for commercial fishing.

The plan prepared by PAN for research on problem MR-I-29 during the current 5-year period, especially in subproblem A, is realistic, but also minimal. This is a result of the need to limit funds. It combines the research of PAN and other interested ministries. The chief emphasis has been put on processing the results collected to date and synthesizing them, since both expedition and equipment possibilities are limited. The plan contains both basic scientific problems, and work of a utilitarian nature that is important for technological progress, which will allow maintaining the priority in research valued in the international forum. A shortcoming of plan MR-I-29 as a whole is the lack of clear priorities for land science, which arouses doubts from the point of view of the usefulness and expediency of work in these remote regions. Also, the separation within problem MR-I-29 of subproblem MR-I-29C, which exclusively covers research on the maritime physical environment, is artificial, since this work is the basis for ecological-oceanobiological research, and it should be carried out jointly within one subproblem, just as in the preceding 5-year period.

From the point of view of usefulness, only live resources can be available to us in the foreseeable future. If so, the role of biological work establishing scientific foundations for studying the live resources of the Antarctic and for economic investments, is of decisive significance in this problem. This should be expressed in the proportions of the financial resources allocated for research. This worthy argument is fully supported and reflected in Council of Ministers resolution number 46/82 of 5 March 1982, regarding the performance of polar research in the years 1982-5. The adoption of the resolution during a difficult period for the country is the best proof of the correctness of the idea of Antarctic research, which originated in PAN years ago, in a small group of people cooperating with Soviet polar expeditions. This activity was the basis for our present independent activities. Following the decisions limiting fishing in U.S. fishing grounds, Antarctica was one of a small number of fishing regions available to us in the year 1981-2, while the Falklands conflict is another example of the need for further intensive interest in the possibilities of fishing for krill, the resources of which lie beyond the shelf zone and the territorial claims of the states of that region.

The opponents of polar activity raise the question of how much this costs. The maintenance of the Arctowski Station with a work force of 20 people costs 50 million zlotys per year; half of this is transportation costs. But for example, at the Arctowski Station one appendix removed from a fisherman in the Polish fishing fleet in that region allows saving the country millions of zlotys, not counting foreign exchange. This is calculated as follows: each day that a ship is catching fish at sea yields a profit of 3 million zlotys, because it takes a vessel with a sick person 3 days to reach the nearest port in Argentina or in the Falklands, and with the 3 days returning, the losses amount to 18 million zlotys, without the hospitalization costs, port fees, etc., which are payable in foreign exchange. There were 5 appendices removed at the Arctowski Station in the 1978-1979 season, saving the lives of the fishermen in two cases. If not a profit, the limitation of the losses is indubitable.

The H. Arctowski Station is providing weather forecasts for the fishing fleet. The profits from this is not measurable, but it may exist. The forecasts increase navigation safety and facilitate the tactics for conducting fishing in the fishing grounds of this region, which is difficult from the point of view of navigation.

Here is one more argument. Each year the Polish H. Arctowski Station is visited during the summer season by 1000 people: tourists, scientists, sailors, and fishermen. Is there an institution in the country that performs an equally significant propaganda role for Polish science and Polish activities?

Currently at the Arctowski Station we are leasing working space to scientists from other countries, and this allows us to obtain considerable foreign exchange funds.

Polar activity is and has been spectacular, and thus attracts the attention of opponents. Propaganda about the success has been undertaken on a large scale during this period. I wish to note, however, that before the success had begun to be discussed in the years 1975-1976, the PAN workers trained themselves and obtained polar experience in Soviet expeditions beginning in 1958. They provided the basis for our current independent polar activity in the scientific and fishing fields in the Antarctic. In April 1982, 42 Polish vessels were fishing in this region.

Antarctic Polar Expedition

Warsaw NAUKA POLSKA in Polish No 3, Mar 82 pp 123-128

[Article by Wojciech K. E. Krzeminski and Edward Wisniewski: "Polish Expedition to the Antarctic to the A. B. Dobrowolski Station, 1978/1979"]

[Text] Due to the Council of Ministers resolution of 29 January 1977 on the development of polar research, a scientific expedition to the Antarctic to the Antoni Boleslaw Dobrowolski Station was organized by the PAN Institute of Geophysics in Warsaw; the expedition lasted from 19 November 1978 to 15 May 1979. The station, originally called Oasis, was established in 1956 in Burger Oasis by a Soviet Antarctic expedition, and was turned over to Poland on 23 January 1959. A 7-member expedition of Polish scientisits, headed by Dr Wojciech Krzeminski, took part in this act of donation. It reached the Antarctic on a Soviet passenger ship along with the next Soviet Antarctic expedition. During a stay of several days at the Station, which received the name of Antoni Boleslaw Dobrowolski from the moment when it was turned over, the Polish scientists performed preliminary research in Burger Oasis, as well as maintenance work on the station. It was not supposed at that time that its reactivation would only take place after 20 years, since it was closed for that long a period.

After a period of extremely difficult preparations lasting several months, on 19 November 1978 a 15-member expedition set out for the Antarctic from Gdynia on the Polish vessel "Zawichost." The composition of the expedition was as follows:

Wojciech Krzeminski--geodetist--head of the expedition--the PAN Institute of Geophysics in Warsaw;

Gabriel Wojcik--climatologist, glaciologist, deputy head of the expedition for scientific matters--the institute of Geography of the UMK [Nicholas Copernicus University] in Torun;

Edward Wisniewski--geomorphologist--the PAN Institute of Geography and Land Management in Torun;

Jan Cisak--geodetist--the Institute of Geodesics and Cartography in Warsaw;

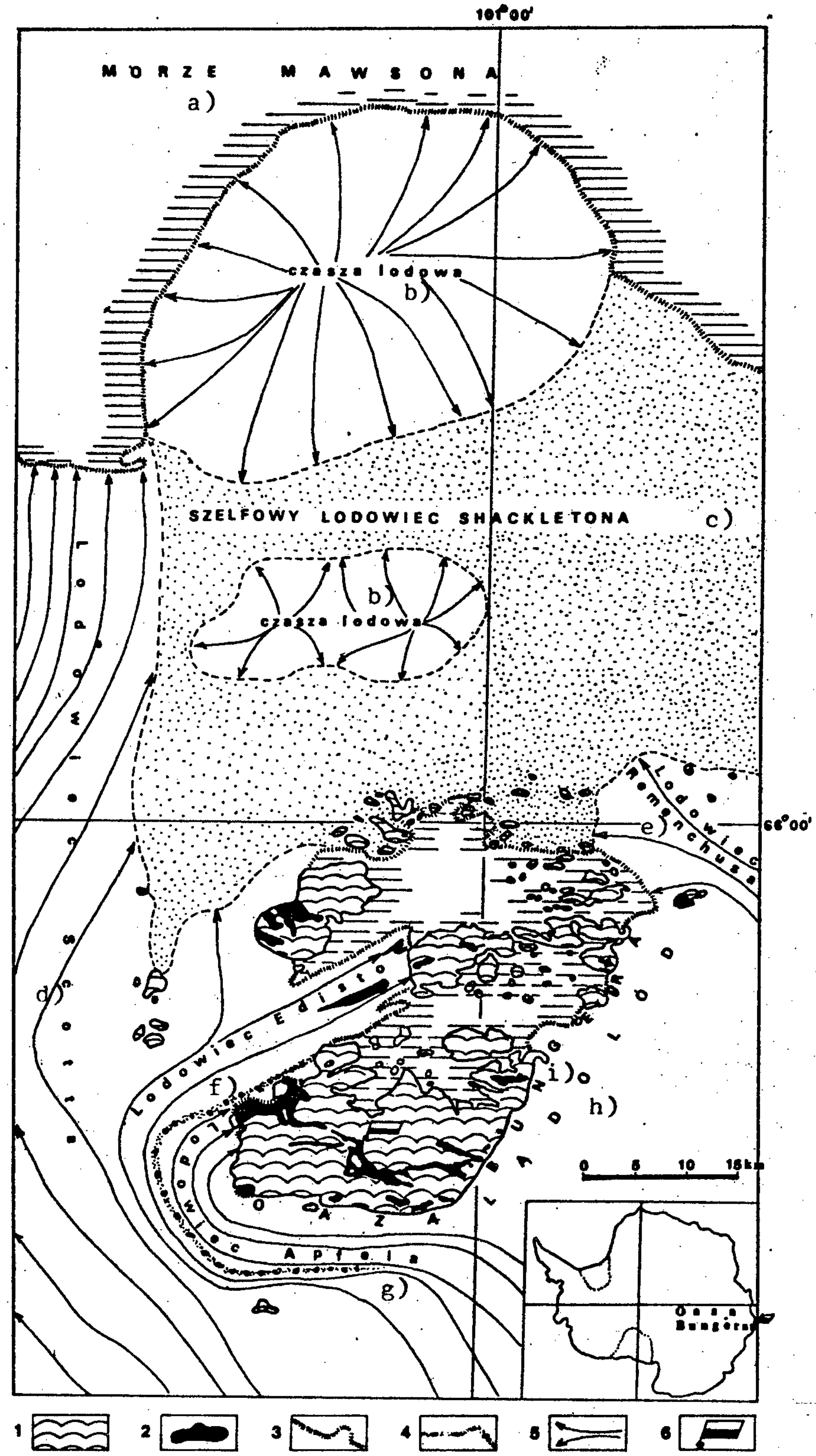
Seweryn Mroczek--geodetist--the Institute of Geodesy and Cartography in Warsaw;

Zbigniew Battke--aerial photogrammetrist--the Topographical Administration of the General Staff of the Polish Army in Warsaw;

Andrzej Pachuta--geodetist--the Institute of Higher Geodesy and Geodesic Astronomy of the Warsaw Polytechnical School;

Bronislaw Swietlicki--doctor--the Army Institute of Aviation Medicine in Warsaw;

Fig. 1--Geographic Situation of the Bunger Oasis



Ryc. I — Sytuacja geograficzna Oazy Bungera

I — obszary wolne od lodu, 2 — jeziora, 3 — klify lodowe, 4 — morena środkowa, 5 — kierunki spływu lodu, 6 — lokalizacja Stacji im. A. B. Dobrowolskiego.

1--areas free of ice;
2--lakes;
3--ice cliffs;
4--central morain;
5--directions of ice flow;
6--location of the A.B. Dobrowolski Station

Key:
a) Mawson Sea
b) ice cap
c) Shackleton Shelf Glacier
d) Scott Glacier
e) Remenchusa Glacier
f) Edisto Glacier
g) Apfel Glacier
h) Continental glacier
i) Bunger Oasis

Zbigniew Kowalewski--deputy head of the expedition for technical affairs, the Organizational-Legal Bureau of PAN in Warsaw;

Czeslaw Opoka--pilot--Poznan;

Stefan Krupski--pilot--Wroclaw;

Maciej Talalas--aircraft mechanic--Darlowo;

Janusz Mazur--aircraft mechanic--Pruszcz Gdanski;

Zdzislaw Stochnial--aircraft mechanic--Wroclaw; and

Janusz Guminski--radio operator--Deblin.

The vessel "Zawichost," which was to be the first Polish vessel to reach and anchor at the coastal sea ice of Antarctica to unload the expedition, is a so-called "lake boat," with a displacement of over 7,000 tons, prepared by reinforced sides to sail in floating ice. Its task was to approach the border of the crumbled ice, and then it was to be conducted by the Soviet icebreaker "Somov" from there to the barrier of the dense sea ice. The subject of assistance to the Polish expedition by the USSR was agreed upon earlier in negotiations between the head of the expedition, W. Krzeminski, and the Scientific Research Institute for the Arctic and Antarctic in Leningrad. "Zawichost" carried about 100 tons of baggage for the expedition, including two Mi-2 helicopters with a total weight of about 20 tons, and 40 tons of fuel. The rest of the cargo, 40 tons, consisted of other technical equipment (e.g. multi-machine units), scientific apparatus, housing equipment, and food. On the way to Antarctica, the vessel stopped in Las Palmas and Capetown.

On 26 December 1978, the vessel was close to a dense mass of already crumbled coastal sea ice, the so-called "shore ice." In view of the Soviet icebreaker "Somov's" long delay in arriving at the Mirnyy Station, the captain of "Zawichost," Wojciech Kozlowski, undertook an independent attempt to approach this station, from which assistance in unloading the equipment was expected. In December 1978 the offshore sea ice was crumbling extremely rapidly; after this the unloaded equipment was to be transported to the continental glacier. This ice situation near Mirnyy made it possible for "Zawichost," after a very unsafe forcing of a wide zone of crumbled sea ice and numerous icebergs, to make a close approach to the cliff of the continental glacier of Antarctica.

After an agreement was reached with the management of the Mirnyy station, on the unloading techniques, the vessel anchored near the snowfield wall on December. This is a form of snowdrift heaped up by oblique winds in the shadow of the cliff of the continental glacier, which facilitates getting onto the continental glacier. The vessel's approach to the snowfield was preceded by measurements of the sea's depth at that spot. After unloading the two helicopters, spare parts, and fuel, the vessel was forced to move away from the snowfield rapidly because of the keel's striking an underwater rock and floating ice. The vessel anchored next to the snowfield again on

6 January 1979, after which the rest of the expedition's baggage was quickly unloaded. On 8 January "Zawichost" set out for Australia, taking with it one member of the crew, pilot Stefan Krupowski, who was ill. As a result of damage to one helicopter during the unloading, the entire expedition had to wait at Mirnyy for assistance from the icebreaker "Somov," which was sailing to that station and on board which were two Mi-8 heavy helicopters.

The management of the Mirnyy Station provided the Polish expedition with suitable housing conditions until its transfer to the A.D. Dobrowolski Station. This occurred on 18 January, after the station was first supplied with fuel by Soviet helicopters halfway between Mirnyy and Bunger [sic] Oasis. These two locations were 350 kilometers apart. All of the equipment and fuel and most of the members of the expedition were transported to the Dobrowolski Station with the assistance of Soviet helicopters. Thanks to this assistance, the Polish flag began to wave over Bunger [sic] Oasis for the second time almost exactly 20 years after the station was turned over to Poland.

With favorable weather during the first few days at the station, which was in good shape after 20 years of disuse, essential housekeeping work was performed at it. The station is located at the center of the oasis above a lake, and consists of two wooden barracks located close to each other and one smaller building several tens of meters away, intended for gravimetric research.

Bunger Oasis has an area of about 500 square kilometers, and is one of the largest in Antarctica. It is a rocky and hilly area, which is in contact with the cap of the continental glacier on the east; on the south and west, it is surrounded by the Apfel and Edisto glaciers flowing from the cap, and on the northern side by this shelf glacier and the age-old sea ice. The main area of the expedition's activities was the marginal zone of the continental glacier, which was also the object of research by a Soviet expedition in the years 1977-8. The purpose of this undertaking was to compare and determine the dynamics of the head of the continental glacier.

There were 22 photographic points designated for the purpose of making a detailed topographical map of the marginal zone of the continental glacier. All of the members of the expedition's scientific group took part in this. Next aerial photographs and measurements were taken of the established polygon-triangulation network. This work was performed in an area 10 kilometers long and 1.2 kilometers wide. Another area for geodetic work was the neighborhood of the station.

In addition to the group activities, the members of the scientific group also conducted their own research programs.

G. Wojcik performed systematic standard meteorological observations and actinometric research. All of the meteorological data were forwarded by radio to the Soviet Mirnyy Station every day.

E. Wisniewski conducted geomorphological research on the marginal zone of the continental glacier, and especially on ice-moraine banks. Specimens were taken from the formations building these forms for sedimentological analysis.

J. Cisak's task was to designate astronomical coordinates for the point at the base of the station. For this purpose he made observations of 27 pairs of stars.

S. Mroczek performed magnetic measurements, electromagnetic measurements of distance, and trigonometric and geometric levelling.

A. Pachuta performed gravimetric research in the region of the oasis and made a measurement of the gravimetric relationship between the Mirnyy Station and the A. B. Dobrowolski Station.

Z. Battke conducted the stabilization of the photographic points and aerial photograhic work.

In view of the fact that the Dobrowolski Station occupies a central position in Bunger Oasis, the transportation of people and equipment to the area was performed without the aid of the helicopter. It was always ready for flight, due to the zealous work of the three mechanics and pilot. A certain shortcoming was the imperfect communications with Poland. It was rather reliable with the assistance of telegrams through the Soviet Mirnyy Station to Poland, but on the other hand there was interference on the reverse line. Communications between the Mirnyy and Dobrowolski Stations took place every day.

From the beginning of the expedition's landing in the oasis, good weather prevailed for scientific activities and also for maintenance work at the station. The air temperature in the course of a day varied from $-3\,^{\circ}C$ to $-5\,^{\circ}C$. That station's surroundings and its interior were put in order. A heavy snowfall on 20 February and the general rapid deterioration of the weather in that part of Antarctica resulted in the expedition's being compelled to leave the station on the following day. The transfer of the people to Mirnyy took place in two stages. First the expedition's helicopter transported people and baggage four times to a distance of 130 kilometers from the station, on the Shackleton shelf glacier, where there was an auxiliary fuel dump. The operation lasted from 9:00 to 17:00 under very difficult atmospheric conditions. The helicopter was flying out of the oasis in fog, to find itself in sunny weather above the shelf glacier after 20 minutes of flight. On the return trip to the station, which was made three times, it was conducted by radio, with poor visibility. At 15:00 an IL-14 aircraft flew to the Shackleton glacier from Mirnyy; after the arrival of the last group of people from the Oasis, it took all of the expedition's baggage and most of the participants back to Mirnyy. There the helicopters were disassembled, maintenance work on them was performed, and they were placed in containers under already difficult weather conditions, with a temperature of $-7\,^{\circ}C$ to $-20\,^{\circ}C$ and very strong slope winds.

The expedition was to be picked up from Mirnyy in the same way that it arrived at Mirnyy, i.e. with the assistance of the Soviet icebreaker "Somov." The only difference was that this task was entrusted to the "Antoni Garnuszewski" training and freight vessel of the Higher Naval School in Gdynia. After picking up the participants in the Antarctic expedition from the H. Arctowski Station, this vessel sailed around half of Antarctica and reached the area near Mirnyy on 14 March. There it was in the middle of a mass of ice chunks and icebergs in stormy weather, with zero visibility. The vessel began to ice over and its ribs began to be bent in, and there was a slight tear in the hull in two places, 3 meters below the water line. At that time the "Somov" was 10 days away from Mirnyy. After 3 days of storm, the weather improved; this allowed the captain of the "Antoni Garnuszewski," Wladyslaw Rymarz, to make a decision on an independent approach to Mirnyy. On 17 March, after a 2-hour stay at the Mirnyy roadstead, during which the expedition embarked, the "Antoni Garnuszewski" set off on the return trip to Poland by way of Australia, where it stopped at Adelaide, Port Pirie, Bell in Tasmania, and Fremantle. The rest of the trip to Gdynia passed through the Indian Ocean, the Suez Canal, the Mediterranean (with a stop at Ceuta), and the Kiel Canal. The expedition returned to Poland on 15 May 1979.

Polar Live Resources Survey

Warsaw KURIER POLSKI in Polish 18-20 Mar 83 p 3

[Interview with Prof Stanislaw Rakusa-Suzczewski of th PAN Institute of Ecology, by Andrzej Markerl: "What Is With the Krill?"]

> [Text] In recent years the Antarctic Ocean has become a major research area. In the face of the raw materials and food crisis appearing in the world, interest in Antarctica is growing. The Antarctic seas are becoming the last great reserve of biological resources on our globe that has not yet been divided up. The mineral and biological wealth of the southern polar regions interest the states belonging to the Antarctic Pact. This group of countries also includes Poland, which in recent years has been developing scientific research which has great significance for a survey of the natural resources of the Antarctic.

"Poland has made a great contribution to biological research on the Antarctic waters," says Prof Stanislaw Rakusa-Suszczewski of the PAN Polish Academy of Sciences Institute of Ecology, a biologist and a polar scientist who has headed several Polish Antarctic expeditions. "Our biological and fishing expeditions to the waters of western Antarctica in the mid-1970's brought interesting scientific results. These were pioneering expeditions on a world scale, which initiated systematic scientific research on the krill and fish, and ensured us a strong position in this field. Today, we are considered on the same level as the United States, the USSR, Japan, and West Germany in krill research."

[Question] Why are we so interested in krill?

[Answer] The possibilities of krill catches are estimated to be about 150 million tons per year, which is twice as much as the world's entire fish catch--70 million tons per year--and thus it is an enormous potential source of protein. Krill occurs in the ocean area, far from the shelves and waters owned by the neighboring states, and is thus available to those who develop the techniques and technology for processing this crustacean. Catching krill is easy, but the processing technology is difficult, and requires improvement. At present krill--also called Antarctic shrimp--is caught on a commercial scale by Japan and the USSR (100 vessels in the 1981-82 season).

[Question] For several years a great deal has been said about the international research program BIOMASS, in which Poland is also taking part. What does it consist of and what is its scientific significance?

[Answer] The BIOMASS program, Biological Research on Antarctic Marine Ecosystems, includes comprehensive biological and ecological research. Krill is the main source of nourishment for fish, cephalopods, seals, penguins, and whales; it is the key element in the Antarctic ecosystem, and thus the main object of the BIOMASS program's research. Knowing the krill's living conditions and the factors favoring its appearance has great significance for research on other marine organisms. This is also related to the practical utilization of Antarctica's biological resources. Setting allotments and scheduling fishing in Antarctic waters require a previous survey of krill resources.

Several states are participating in the BIOMASS program, which was organized at the initiative of the Scientific Committee for Antarctic Research [SCAR]. Research is conducted in accordance with a uniform system by sea expeditions and coastal polar stations. It is worth recalling that the first major research was undertaken by our krill expeditions in the years 1975-76.

[Question] What has already been done in the BIOMASS program?

[Answer] The first stage in the program began in February 1981. This was the so-called First Biological Experiment, FIBEX. Designated areas in different regions of Antarctica were reached by 17 vessels from 11 states. Our expedition, on the "Professor Siedlecki," conducted research, along with vessels from the USSR, Great Britain, West Germany, Japan, Chile and Argentina in the waters of western Antarctica--in the region of the South Shetlands, in Scott Sea, in the Drake Strait. The FIBEX experiment brought interesting results. The research revealed many new previously unknown regions in which concentrations of krill occur, especially in the Indian Ocean. Preliminary assessments were made of the quantity and distribution of krill in the Atlantic sector of the Antarctic.

The BIOMASS program created a Computer Data Center, at which the results of all of the states participating in the research were recorded in a uniform manner, and provided a basis for joint processing. The Data Center is located in Bremerhaven, West Germany. The data from the BIOMASS program are also to be utilized by the Convention on the Protection of the Live Resources of the Antarctic, to which Poland is a signatory.

[Question] What will happen further with biological research on the Antarctic seas?

[Answer] Toward the end of 1982, the SCAR working group that was coordinating the BIOMASS program met at the Polar Institute in Bremerhaven, West Germany. The continuation of the research initiated in the FIBEX experiment was directed. Preparations have been undertaken for the Second Biological Experiment, SIBEX, in 1983-84. There will be 10 states belonging to the Antarctic Pact, including Poland, taking part in this experiment. The research will be conducted in western Antarctica, the Brandsfeld Strait, and in the region to the north of the South Shetlands. This region particularly interests Poland in view of our long-standing research in those waters.

In the previous research campaign, the main emphasis was on a survey of the regions where krill concentrations occur and on determining the quantities of those animals. The next research will concentrate on a survey of the environment in which krill lives. This will permit learning the conditions necessary for its development and establishing the reasons why it accumulates in large concentrations.

[Question] What will Poland's future participation in this research be like?

[Answer] We do not want to waste what we have achieved thus far. An expression of acknowledgement for Polish science's great contribution to biological research on the Antarctic waters, and especially on krill, was SCAR's entrusting me with the preparation of detailed research plans for the individual states participating in the SIBEX experiment. A prominent role in these plans will be played by the research stations in western Antarctica, with the Arctowski Station particularly being considered. It is not known whether it will be possible, in view of the high costs, to send a sea expedition on the vessel "Professor Siedlecki." Particular significance is therefore being ascribed to the participation of our station in the BIOMASS program and the efforts we have undertaken to internationalize the research teams and the participation in the research costs.

[Question] What practical significance does this research have?

[Answer] The work performed in the BIOMASS program has already been directly linked to the practical implementation of the Convention on the Protection of the Live Resources of the Antarctic, which was signed in 1980 in Canberra, the capital of Australia. The convention, in the development of which Poland also participated, creates the conditions for the protection and rational exploitation of the live resources of the Antarctic seas and the Antarctic Ocean. The BIOMASS program is creating the scientific foundations for implementing the convention and concluding agreements already defining in more detail the rights of individual states to exploit the biological resources. Poland's great contribution to the scientific research and its work on the convention give our country the right to participate in making decisions on the methods of using the natural wealth of the Antarctic.

There have already been measurable results. Our ocean fishing fleet has already been operating for several years in the region of western Antarctica. It was preceded by research vessels. Our earlier interest in the Antarctic seas and the south Atlantic is paying off at present--since as a result of the U.S. sanctions we have lost access to many traditional fishing grounds in the western hemisphere.

[Question] Thank you for the interview.

Polar Isolation Study

Warsaw ZOLNIERZ WOLNOSCI in Polish 12-13 Feb 83 p 5

[Article by Wlodzimierz Skubis: "A Man Among the Ice of Antarctica"]

[Text] The modern epoch is a special one, and is in fact proceeding under exceptionally civilized conditions, during the period called the scientific-technical revolution. The dynamic development of science and technology is giving rise to different and often mutually exclusive interpretations and visions of the world, from catastrophic to absolutely optimistic ones. Some people, generalizing the negative consequences of the scientific-technical revolution, voice a catastrophic vision of the human world (the atomic destruction of life and the species, or if not, then the biological and individual degeneration of man). Others, on the other hand, generalizing the positive results of this revolution, spread before humanity a vision of a mankind that has already allegedly solved all of the problems of material existence today. It is not difficult to see that both visions are metaphysical and antidialectical in nature, and in a word, one-sided. Nevertheless, neither science nor technology is responsible for the consequences that are ascribed to them, but rather concrete living people.

The fact is, however, that the development of the scientific-technical revolution is bringing with it qualitative changes in the technological base of production, bringing about a fundamental transformation in the productive forces of modern society, and creating a new kind of worker, who more and more often has to work under so-called artificial conditions.

The activity of a person under artificial conditions limiting the "normal dose" of stimulation has become the subject of intensive research by specialists concerned with man, i.e. psychology, sociology, physiology, psychiatry, etc.

Although for a long time now we have known the effects of a man's remaining in environments and situations deficient in stimuli (e.g. the children "brought up" by animals, the journals of solitary sailors or castaways, etc.), nevertheless scientific research on the effects of deprivation was only begun in the 20th century.

The subject of deprivation has not been dealt with extensively in Polish literature, however. It is true that publications have appeared, but most of them were fragmentary in nature, and not complete and comprehensive. Thus, we may consider as an event the book by Jan Terelak, "Czlowiek w sytuacjach ekstremalnych: Izolacja antarktyczna" [Man in Extreme Situations: Antarctic Isolation], which is devoted to a psychological analysis of man's functioning in situations characterized by a shortage of stimulation. The author, as the first Polish psychologist to stay at the Polish H. Arctowski Station as part of the Third PAN Antarctic Expedition, conducted research on the conduct and activity of the participants in the expeditions under conditions of isolation and danger.

Three fundamental strata can be distinguished in the work. The first and most extensive has the nature of a theoretical review, not to say a report, and represents an attempt to present the current state of knowledge of the subject of man's functioning in deprivation situations. The second presents the characteristics of the Antarctic environment as a "natural laboratory" for research on man's adaptation of the most complex extremal situations. Finally the third part, the empirical one, is a presentation of the results of the research, an analysis of them, and an attempt at objectivization.

The empirical part of the work deals with the fundamental assertion of ecological psychology, which assumes that the consequence of a man's remaining in relations with his environment is dealing with those relations in the categories: active environment--active person. An effect of this view is the fact that "it is not sufficient to know the subject itself (the structure of the personality), or the states of the matter (a description of the environment), or even to know the man's connection with his environment (interactions), but it is necessary to know the man's relations with his environment in the psychological sense, i.e. awareness of the significance that these relations have for the man (the man's position in the environment, the situation, or an event)." Unfortunately, the author did not seek ontological justifications for this supposition in marxist philosophy (for example in the works of Karl Marx: "Economic-Philosophical Manuscripts From 1844," or also "Theses on Ludwig Feuerbach"), contenting himself solely with the assertions of ecological psychology. The consequence of the praxis of marxist philosophy is creationism, understood as an expression of activism and man's creative attitude toward reality. Such an understanding of the problem is created only by an explanation of the dialectics of the relationship between man and the world.

The proposition of explaining the complex problems of deprivation through the example of a small test population under the conditions of the Antarctic station is interesting. In the author's opinion, such a solution was supported by the following arguments: 1) "Antarctic isolation is a special case of social isolation, since it includes both some elements of sensory deprivation, monotony, and confinement"; 2) "...like classic experimental isolation associated mainly with a limitation on information from the external world and a failure to satisfy many basic needs," Antarctic isolation is thus a difficult situation "both from the viewpoint of physical features (climatic and geographic conditions, light-darkness, etc.), and also from the psychological (the lack of gratification of many needs) and social (functioning in a small group of people for a fairly long time) viewpoints." The correctness of such a view is demonstrated not only by the data in the literature on this subject, but mainly by the results of research, among others those presented in this work.

Viewing the situation of isolation as a complex system of mutually interdependent constituents: stimulative, value and possibility, social, and spatial-temporal, the author of the book concentrates on the part of the problems dealing with the broadly understood individual and group adaptation, and the so-called psychological costs accompanying the processes of adaptation to the stress conditions of the polar station. Such a research perspective entails certain practical determinations, especially from the standpoint of the choice and selection of candidates for work in extremal situations (e.g. space flight, scientific expeditions, etc.).

The results presented in the empirical part are only a partial illustration of the theoretical-review stratum. The truth is that this is the first work of this type in Polish psychology, and as the author writes, it is necessarily of the nature of an exploratory review. It appears, however, that renouncing the report-review convention in favor of presenting only the main problems in man's functioning in a situation of isolation could considerably balance the proportions between the theoretical part and the empirical part.

The book is aimed at both army specialists and commanders, and at political officers, and this is the reason for its popular-science nature. This, however, does not exempt the author from the [need for a] uniform convention of the text. While the informative parts of the book are rendered in a popular-science style, the descriptive parts, on the other hand, are in a diary-memoir style.

This data in the literature on the subject, and the research results themselves, and their relevance from the viewpoint of the dynamic development of modern civilization, make the book one of the important events in publishing.

Jan Terelak: "Man in Extreme Situations: Antarctic Isolation," MON, Warsaw 1982, p 352

Replacement of Polar Crews

Warsaw TRYBUNA LUDU in Polish 28 Feb 83 p 1

[Article by PAP: "Polar Crews To Be Replaced Soon"]

[Text] The work force at the Polish polar station on King George Island in western Antarctica is to be replaced soon. The seventh PAN expedition, which is to take over from the present polar crew, has been on its way for several weeks. The expedition is sailing on the vessel "Zawichost," which while sailing to the ports of South America will leave our polar scientists off on

King George Island. Several years ago, "Zawichost" sailed Antarctic waters, taking our polar expedition to the Dobrowolski Station in Bunger Oasis in eastern Antarctica. The vessel is expected to arrive at King George Island around 2-3 March, and will remain there for 7 days. At that time the polar crews will be replaced and supplies will be unloaded for the Arctowski Station.

It is presently late fall in Antarctica. Seals and birds are leaving the island, moving to warmer surroundings. The station is preparing for winter.

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DATA PROCESSING SYSTEMS PLANNED, DEVELOPED FOR INDUSTRY

Bucharest REVISTA ECONOMICA in Romanian No 11, 18 Mar 83 pp 15, 16

[Article by Adrian Davidoviciu, director at the Central Institute for Management and Data Processing]

[Text] The strong orientation toward an intensive development of the national economy, established by the 12th Congress and stressed by the National Conference of the Party, supports the expansion of computer technology and the encouragement of computer automation and data processing in production and management, as a primary component of the scientific and technical revolution. Among the tasks stipulated in this respect by the Program-Directive for Scientific Research, Technologic Development, and Introduction of Technical Progress During the Current Decade and Until the Year 2000, are the development and perfecting of computer systems for technical processes, including industrial robots. Industrial computerization appears as an indispensible factor for high economic efficiency in fulfilling the objective formulated by the secretary general of the party, Nicolae Ceausescu, which is to reach by the end of the present five-year plan, the level of social labor productivity of some developed countries.

The partial substitution of operating personnel--with a consequent improvement in labor productivity--is only one of the major economic effects of computer utilization in monitoring and controlling tools and technical processes. Unlike conventional automation systems, process computers not only control technical processes within given limits, but also control several correlated technical parameters, so that by calculating technical-economic indicators, they obtain optimum values for these indicators, such as maximum productivity or profit, minimum consumption or costs, and so on.

Romanian Computer Equipment for Technical Process Management

The computer management of technical processes is a real-time data processing system capable of acting in timely fashion on the process being controlled, thus contributing to: higher production with given technical tooling (preventing accidental interruptions, reducing the duration of transient rates in starting and stopping, or in changing models being manufactured on production lines, and so on); more efficient utilization of raw materials, reduced specific consumptions of materials, power, and fuels; assuring better and consistent quality for products, and reducing rejects.

In Romania, the first process computers, which were imported complex technical installations with associated computers, began to be used in 1965-1966.

Together with the creation of the Romanian computer industry, it became possible to introduce the domestic fabrication of process computers. The first of these--a creation of specialists at the Institute for Computer Technology (ITC) and at the Institute for Automation Research and Design (IPA)--was the FELIX C-32 P, placed in mass production in 1976. Performing the functions of centralized monitoring and control, and allowing operators to guide and control processes, this unit is used as part of computer control systems for technical processes in the cement, power generation, chemical, petrochemical, and other industries.

Two versions--DELIS and SUPROS--of basic and process (problem oriented) programs were formulated for this computer.

Following a first pilot application--at the Central Institute for Management and Data Processing (ICI)--of a minicomputer (at which time a number of technical approaches were tested for the first time in Romania, including direct numerical control, multivariable and optimal regulation on the basis of an internally memorized mathematical model, color displays, and so on), the construction of the following microcomputers gradually began in Romania in 1978: the FELIX MC-8, FELIX M-18, 118, and the process microcomputer ECAROM 800/880; as well as of the minicomputers INDEPENDENT 100/102 F, and CORAL 4001/4011/4030, manufactured at the Computer Enterprise (ICE) and the Automation Components Enterprise (IEA) of Bucharest, according to designs formulated by specialists at the Bucharest Polytechnic Institute (IPB), as well as at IPA, ITC, and IEA.

The ECAROM 800 process microcomputer and the I-100/102 F minicomputers were also adopted internationally as part of the mini and microcomputers families manufactured by CEMA member nations, and ECAROM 800 was qualitatively tested in France to form the hierarchic production control computer system at the OLTCIT Craiova automobile enterprise. Romanian equipment for technical process management has also been exported as part of complex installations or as individual deliveries.

Intensive activity for process computer modernization and development is presently being carried out; the introduction of a miniaturized (single chassis) process computer with low power consumption, the ECAROM 880 (at IEA), and of the process microcomputer SELROM (at ICE) are now being finalized.

The ECAROM 800/880 equipment can be used both independently and as a programmable process interface for minicomputers, with which it can be interconnected.

Among the computer equipment designed for industrial applications, are the programmable automatic units AP 107/AP 117 manufactured by Automatica in Bucharest.

In order to develop the utilization of the domestic microcomputers FELIX M-18 and M-118, as well as that of minicomputers in the management of tooling and technical processes, ICE has built the SPOT-80, an assembly of analog and digital input/output modules (with its own processor, an option of technical operator console, three display screens, and an alphanumeric and functional keyboard) which can function both autonomously for simple monitoring applications, and as a programmable process interface, coupled with a universal micro or minicomputer through standard synchronous local or remote connections, and with a broad range of peripheral equipment.

General-Use Program Products, Complex Computer Management Systems

As basic and applications general use programs for industrial process management using the FELIX M-18, 118, and ECAROM 800/880 microcomputers, ICI has formulated the real time operating system RTOS-80 and the basic programs package PROCES-MICRO. Among other program products for dedicated applications--which were written with the contribution of research and design institutes, and of computation centers--are: automatic switching of railway cars, COMATI (currently used at the Bucharest II Switchyard and being extended to other switchyards); automatic control of electric arc furnaces at the Hunedoara Steel Combine; monitoring 330 MW power generators at the Galati thermal power plant; management of technical processes in the cellulose industry (at the Dej and Suceava combines), and in the preparation of non-ferrous ores (at the Tarnita Works). Other applications using the M-18/118 microcomputers and the SPOT intefaces are also at advanced phases, particularly in power generation (Turceni and Rovinari thermal power plants, Bucharest-South station), metallurgy (Slatina Aluminum Enterprise), and so on.

Also notable are various complex systems for managing technical processes by means of minicomputers and one or several interconnected microcomputers, among which are: the process computer system at OLTCIT, mentioned above; a power distribution controller at the Tractorul enterprise in Brasov; and a system for technical process management at the Cimpulung Combine for Artificial Fibers and Filaments. Power distribution systems for electric network enterprises (Brasov, Suceava) are presently at an advanced phase of testing and integration at ICI; and applications for computer management of vertical warehouses, as well as a system to control technical processes in a pelletization plant for iron ore in India, and so on, are being designed with the collaboration of IPA, ISPE (Institute for Power Studies and Design), ICEMENERG (Institute for Power Research and Modernization), IPROMET (Design Institute for Metallurgical Plants and Installations), the Chemical Industry Computer Center, and so on.

A number of concrete examples demonstrate the extensive possibilities for exporting computer control systems for technical processes, both as independent units and as part of complex technical installations, under economically advantageous conditions (due primarily to the technical and economic competitiveness of Romanian achievements in the design and formulation of computer programs).

Notable in this respect is the successful completion (especially by ICI and IPA, as institutes specializing in computers and automation, respectively) of standard programs adaptable to various applications, which significantly reduce the cost and duration of providing computer systems for the management of technical processes. These are general use program products (such as RTOS-80, PROCES-MINI, and PROCES-MICRO) and instrumental programs (such as SIPAC, for computer assisted design of automatic control systems), produced by ICI and used by IPA. Mainly because of these standard packages of programs, the major current restriction here (as opposed to the situation existing in other countries) in providing the largest possible number of computer control applications for technical processes in the shortest possible time, is not the effort in writing application programs, but rather the number and delivery rate of the necessary computer equipment, and primarily of process interfaces and minicomputers.

In terms of economic efficiency, it can be said that where industrial objectives and technical solutions have been correctly selected, where none of the many specifications of design, implementation, and exploitation of application have been neglected, and where the user's specialists provided not only support, but also became directly involved, the results have been and are positive.

Present Orientations and Requirements

Consistent with the Program for Developing Computer Systems in the Economy and for Providing Computer Technology During the 1981-1985 Period, the introduciton of process computers in a number of basic economic branches will continue at a rapid rate. The extension of computer systems for controlling technical processes in power generation (including the nuclear power program), metallurgy, chemistry, machine construction, and so on, imposes the development of computer equipment production (process interfaces, mini and microcomputers); the judicious selection of industrial objectives in which they are to be used; and the coordination of specialists' efforts at ICI and IPA, at territorial, departmental, and large industrial computation centers, at institutes for research and technical design, and at higher education schools, so as to achieve in the shortest possible time applications with significant technical-economic effects.

For discrete industrial technical processes (of the assembly-installation type), the achievement of high economic efficiency through production automation raises a number of specific, complex problems, that are difficult to solve with the conventional automation systems devoid of flexibility that have been used until now. The solution rests in flexible automation, through the use of industrial robots and process computers.

An important event occurred in 1982: the first models of industrial robots were introduced as part of a special program at MIMUEE (Ministry of Machine-Tool Industry, Electrical Engineering, and Electronics). These models will be placed in mass production as RIP 6,3, RIC 25, and RIS 63, at the Automatica enterprise and the Titan Institute for Scientific Research and Technical Engineering, with the contribution of other institutes such as IPA (command portion), ICI (instruction portion), ICPE (Research and Design Institute for the Electromechanical Industry), IPB, and others.

(Given the current and future importance, and the complexity of industrial robots, we will discuss the topic in a future issue).

Conditions presently exist for the large scale introduction of industrial computer systems in our country's economy, with all its consequent socioeconomic advantages. To this end, I believe that the following priority actions be pursued:

Units which manufacture mini and microcomputers (ICE) and displays (Peripheral Equipment Enterprise) must develop the production volume for such equipment to the level demanded by the national economy and exportations, devoting greater attention to the additional reliability of units intended for industrial applications (more rigorous selection of components and subassemblies, completion of adjustments, testing, and preliminary running, and so on), in accordance with the requirements imposed by operating conditions;

Starting true mass production of process interfaces (produced by ICE and IEA) to meet the demand of the national economy, as well as continuing the diversification and improvement of these units;

Designing and proceeding to the mass production of single chip mini and microcomputers, and of color displays (which will reduce dimensions or eliminate many very costly control panels);

More effective collaboration from the start, between equipment designers (ICE, ITC, IEA, IPA, IPB) and program writers (ICI, IPA, and others), so that programs (basic and applications) will be available at the same time as the equipment;

Applications designers must as perseverently as possible provide standard and tested solutions and general use program products;

Users in the economy must devote more consistent efforts to preparing the implementation of these applications (including the professional training of workers) and organizing efficient exploitation;

Prompt service for this equipment must be organized;

A minimum stock of spare parts must be assured at the location of each application;

Specialized personnel must be trained in this expanding area by high and intermediate education units;

More decisive orientation (without the unjustified delays that are experienced at present) of industrial objective designers toward the inclusion of appropriate industrial computer systems in complex installations that are delivered abroad.

Accelerated progress in this domain will contribute to a higher technical level and economic efficiency in production, and to Romania's entry into the ranks of economically developed countries.

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