

Zeitschrift: IABSE surveys = Revue AIPC = IVBH Berichte
Band: 11 (1987)
Heft: S-37: Report on the use of computers in 1986

Artikel: Report on the use of computers in 1986
Autor: Frandsen, Aksel G.
DOI: <https://doi.org/10.5169/seals-50712>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 19.03.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Report on the Use of Computers in 1986

Rapport sur l'utilisation des ordinateurs en 1986

Bericht über Verwendung des Computers im Jahre 1986

prepared by **Working Commission VI of IABSE**
«Informatics in Structural Engineering»

coordinated by **Aksel G. FRANSEN**
Chairman WC VI
Cowiconsult
Virum, Denmark

SUMMARY

An investigation was carried out in 1986 in order to find out more about the utilization of computers by members of the IABSE. Answers came from over 40 countries, mainly from representatives of consulting engineering firms and university institutes. The microcomputer was already in use by 80 % of those who replied. Computers are employed in all sectors (administration, budgets, infographics, word processing, etc.) but obviously in 90 % of the cases, they are used in design and analysis. The investigation revealed that there were as many of those persons having replied using «in-house» software as there were using software obtained externally. Lastly, the investigation revealed the type of information that members of the IABSE expect from the Working Commission «Informatics in Structural Engineering».

RÉSUMÉ

Une enquête a été réalisée en 1986 afin de mieux connaître l'utilisation des ordinateurs par les membres de l'AIPC. Les réponses proviennent de plus de quarante pays, essentiellement de représentants de bureaux d'ingénieurs et d'instituts universitaires. Le micro-ordinateur avait déjà fait son apparition chez 80 % de ceux ayant répondu à l'enquête. L'ordinateur est utilisé dans tous les domaines (administration, budget, infographique, traitement de texte, etc.) mais il est utilisé évidemment dans 90 % des cas pour le calcul du projet. L'enquête montre qu'autant de personnes ayant répondu font usage d'un logiciel «maison» que d'un logiciel acquis à l'extérieur. L'enquête montre enfin le genre d'information que les membres de l'AIPC attendent de la Commission de Travail «Informatique et constructions de génie civil».

ZUSAMMENFASSUNG

1986 wurde bei den IVBH-Mitgliedern eine Untersuchung über die Verwendung des Computers durchgeführt. Aus mehr als 40 Ländern wurden Antworten erhalten, vorwiegend von Vertretern von Ingenieurbureaus und Universitätsinstituten. Bei 80 % derjenigen, die antworteten, wird der Mikro-Computer bereits benützt. Computer werden in allen Sektoren verwendet (Administration, Budgetierung, Infographik, Textverarbeitung usw.), das Schwergewicht der Anwendung (90 %) liegt jedoch auf den Gebieten der Berechnung und Bemessung. Die Untersuchung ergab, dass von den Anwendern hauseigene Software wie auch fremde Software verwendet wird. Schliesslich zeigt die Untersuchung die Art der Information auf, welche die IVBH-Mitglieder vom Arbeitsausschuss «Informatik im konstruktiven Ingenieurbau» erwarten.



Introduction

The aim of IABSE Working Commission VI is, in brief, to make information on development and research within the field "Informatics in Structural Engineering" - irrespective of the source - available to the average IABSE member.

However, as the field is extensive and under rapid development and change, the efforts of the W.C. could easily be less fruitful if areas that lie outside the interest of the average IABSE member are addressed.

The actual needs of the average IABSE members are, unfortunately, not very well known to the members of the W.C.

The Working Commission therefore decided at its meetings in Luxembourg, September 1985, to try to gain a better basis for its future work by improving its knowledge regarding computer usage amongst IABSE members.

A questionnaire was composed and sent out to all IABSE members in December 1985 together with a covering letter explaining the background for the investigation. A total number of about 3000 questionnaires were sent out and 332 completed forms were received, most of them within the scheduled time.

Considering that the questionnaire appealed more to firms and institutions of a certain size rather than to single members - the number of completed forms received must be regarded as satisfactory.

In order to facilitate the analysis of the answers to the different questions, a database containing the answers was created using "INFORMATION" on the PRIME 850 computer at disposal in the editor's firm, Cowiconsult, Denmark.

The present report shows the results of the analyses, chosen by the editor and it is hoped that these analyses illustrate the situation of computer usage amongst IABSE members.

Results

The distribution of answers on countries is shown in Table 1. 43 different countries are represented from all parts of the world. 10 answers did not indicate country. The only major area missing in the list seems to be the USSR.

COUNTRY	No of answers	COUNTRY	No of answers
ARGENTINA	2	LUXEMBOURG	2
AUSTRALIA	8	MOROCCO	1
AUSTRIA	20	THE NETHERLANDS	5
BELGIUM	6	NORWAY	4
BRAZIL	4	PAKISTAN	1
CANADA	14	PERU	1
CHINA	2	POLAND	2
COLOMBIA	1	PORTUGAL	2
COSTA RICA	1	SAUDI ARABIA	1
DENMARK	13	SOUTH AFRICA	11
EGYPT	2	SPAIN	15
FINLAND	7	SRI LANKA	1
FRANCE	7	SWEDEN	11
GERMANY	34	SWITZERLAND	41
GREECE	5	SYRIA	1
HONG KONG	2	TAIWAN	1
INDIA	9	THAILAND	2
INDONESIA	2	UK	25
ISLAND	1	USA	26
ISRAEL	2	VENEZUELA	2
ITALY	11	YUGOSLAVIA	4
JAPAN	12		

Table 1. Distribution on countries

In order to facilitate the presentation of the results, each field in the questionnaire has been given a field number, F11 to F78. The field numbers are shown in a copy of the form, see Appendix I, and the relevant field numbers are indicated for each table of results.

Table 2 shows the distribution of answers on the different types of memberships and on the different sizes of the institutions or firms.

The answers not indicating type of membership are listed in the column marked NIL. It is seen that most of the answers are presented by individual members, though generally on behalf of larger organizations.

The information on junior/ordinary/senior degree is not complete, but it is remarkable that the number of junior answers is very small and at the same time that quite a number of seniors seem to maintain an interest in computer usage.



Relevant fields:

F11 = Individual member
 F12 = Junior
 F13 = Ordinary
 F14 = Senior
 F15 = Collective

Size of firm	F11	F12	F13	F14	F15	NIL
Not indicated	8	1	4	1	1	1
1	9	0	4	3	0	0
2 to 10	49	0	36	3	2	1
11 to 50	83	1	58	8	11	2
51 to 250	58	2	39	5	21	2
251 to 1000	39	0	24	8	20	2
More than 1000	10	0	4	0	11	2
total	256	4	169	28	66	10

Table 2. Type of membership

Table 3 shows correspondingly the distribution of answers on the different types of institutions or firms, and also on the different size categories. The dominant group here consists of consulting engineers, although scientific and educational institutes also form strong groups. Group F29, indicating those that do not feel they belong to the listed types of institutes or firms, is rather small, and a closer look on the indicated "other types" has convinced the editor that most of the answers under F29 could have been placed under the listed types.

Relevant fields:

F21 = Scientific institute
 F22 = Educational institute
 F23 = Library
 F24 = Public service
 F25 = Contractor
 F26 = Consulting Engineer
 F27 = Softwarehouse
 F28 = Computer Service Bureau
 F29 = Other

Size of firm	F21	F22	F23	F24	F25	F26	F27	F28	F29	NIL
Not indicated	1	2	0	0	0	5	0	0	1	1
1	0	0	0	0	0	9	0	0	1	0
2 to 10	7	7	0	0	0	38	4	0	4	1
11 to 50	13	11	0	3	4	69	5	3	5	0
51 to 250	8	12	2	7	9	47	1	0	5	1
251 to 1000	8	16	0	9	8	24	2	0	5	0
More than 1000	3	3	0	5	8	4	0	0	3	0
total	40	51	2	24	29	196	12	3	24	3

Table 3. Type of institution

Table 4 shows the distribution of the different computer types on the sizes of the institutions and firms. It may be seen that 78% use PC/Micros, 50% use Minis, 37.5% have a main frame at their disposal, 27.4% use CAD, and 26.5% use Service Bureaus. It should be noted, however, that the distinctions made between minis and main frames are not clear and some overlapping occurs (some minis are placed in the main frame field). The information given on type and operating system is reproduced in raw lists in Appendices II to V.

Relevant fields:

- F42 = PC/Micro
- F43 = Minicomputers
- F44 = Main frame
- F45 = CAD-system
- F46 = Access to Service Bureau(s)

Size of firm	F42	F43	F44	F45	F46	NIL
Not indicated	9	3	6	3	2	1
1	4	1	1	0	3	2
2 to 10	40	17	11	3	14	1
11 to 50	64	44	28	21	22	1
51 to 250	71	41	28	19	24	0
251 to 1000	52	43	35	32	17	2
More than 1000	19	17	16	13	6	0
total	259	166	125	91	88	7

Table 4. Type of computers used

Table 5 shows the number of terminals as the minimum, the maximum, and the average number for the different sizes of firms or institutions.

Size of firm	Min	Max	Average
1	0	1	0
2 to 10	0	31	3
11 to 50	0	40	6
51 to 250	0	250	18
251 to 1000	0	550	90
More than 1000	0	2000	230

Table 5. Number of terminals



Table 6 shows the distribution of the different types of work carried out on computers. Here the predominant type is calculations, but all types of work are well represented. However, the editor finds that the use of information retrieval is rather low. The fields indicated in connection with F58, other applications, are reproduced in the listing in Appendix VI.

Relevant fields:

F51 = Administration
 F52 = Budgetting
 F53 = Planning & Steering
 F54 = Calculation
 F55 = Word processing
 F56 = Production of drawings
 F57 = Information retrieval
 F58 = Other

Size of firm	F51	F52	F53	F54	F55	F56	F57	F58	NIL
Not indicated	6	5	1	9	7	6	5	0	1
1	1	1	0	5	3	0	1	1	3
2 to 10	13	7	6	46	26	8	5	6	1
11 to 50	51	21	15	91	60	31	16	12	1
51 to 250	60	36	31	74	59	28	26	13	0
251 to 1000	39	34	30	58	50	35	35	18	2
More than 1000	18	20	17	21	18	16	17	5	0
total	188	124	100	304	223	124	105	55	8

Table 6. Type of work made on computers

Table 7 shows the distribution of answers to the questions on software usage. Most answers indicate use of both in house developed programs as well as commercial packages. The areas dealt with are listed in Appendix VII.

Relevant fields:

F61 = In house developed programs
 F62 = Commercial packages

Size of firm	F61	F62	NIL
Not indicated	8	9	1
1	5	3	3
2 to 10	38	37	2
11 to 50	81	75	2
51 to 250	71	68	4
251 to 1000	58	51	2
More than 1000	21	20	0
total	282	263	14

Table 7. Software usage

Table 8 shows the distribution of answers to questions concerning type of information wanted from W.C. VI. The main interests seem to be:

- Collected Lists of New Programmes
- Reports on New Computer Applications
- State of the Art Reports

while:

- Reports on Ongoing R & D
- Symposium on Structural CAE

also attract some interest.

Relevant fields:

- F71 = state of the art reports
- F72 = short reports on ongoing R&D
- F73 = collected lists of new programmes
- F74 = reports on new computer application
- F75 = specialized symposia on subareas
- F76 = symposium on whole area of structural CAE
- F77 = theme on structural CAE at IABSE congress
- F78 = other information

Size of firm	F71	F72	F73	F74	F75	F76	F77	F78	NIL
Not indicated	9	6	6	8	4	5	2	1	1
1	3	2	3	3	1	2	0	0	4
2 to 10	22	12	33	26	12	7	11	3	5
11 to 50	58	36	64	50	20	27	13	6	5
51 to 250	49	31	49	52	15	27	11	3	2
251 to 1000	36	26	42	46	11	24	20	5	2
More than 1000	15	10	14	15	3	6	7	4	0
total	192	123	211	200	66	98	64	22	19

Table 8. Type of information wanted

The areas indicated for specialized symposia are listed in Appendix VIII.

The indicated themes suggested for structural CAE at an IABSE congress are listed in Appendix IX. Finally Appendix X contains a list of the other types of information wanted from W.C. VI.



Conclusions

Taking the answers to the questionnaire as a true expression for the status of computer usage among the "clients" of W.C. VI - i.e. those members of IABSE interested in this field - the W.C. now has a much better basis for structuring its future work.

However, the indicated priorities raise serious problems for W.C. VI in so far as the most wanted types of information are volatile and therefore very difficult to produce and publish in a reliable up to date form.

Copenhagen July 1986, revised January 1987

Aksel G. Frandsen



Appendix I. Questionnaire

International Association for Bridge and Structural Engineering
Association Internationale des Ponts et Charpentes
Internationale Vereinigung für Brückenbau und Hochbau



IABSE
AIPC
IVBH

IABSE Working Commission VI: Informatics in Structural Engineering

Questionnaire on Computer Usage

1) IABSE Membership:

Country:
F11 Individual Member [] Indicate type: Junior [] Ordinary [] Senior []
F15 Collective Member []

2) Type of firm or institution:

- F21 [] Scientific institute
F22 [] Educational insititute
F23 [] Library
F24 [] Public service
F25 [] Contractor
F26 [] Consulting Engineer
F27 [] Softwarehouse
F28 [] Computer Service Bureau
F29 [] Other (indicate type)

3) Size of organization

- x = numbers of employees:
F31 [] x = 1
F32 [] 1 < x ≤ 10
F33 [] 10 < x ≤ 50
F34 [] 50 < x ≤ 250
F35 [] 250 < x ≤ 1000

NB: The following points 4 - 7 should preferably be answered by one person only per organization.

4) Edp-equipment

F41 Does your organization use computers in its professional work: Yes [] or No []

In the affirmative, which type of computers do you use:

- F42 [] PC/Micro Type:....., Operating system:.....
F43 [] Minicomputers Type:....., Operating system:.....
F44 [] Main frame Type:....., Operating system:.....
F45 [] CAD-system Type:.....
F46 [] Access to Service Bureau(s)

To describe the level of usage please indicate approximate total number of terminals for all systems



5) Which type of work do you use computers for:

- F51 Administration
- F52 Budgetting
- F53 Planning & Steering
- F54 Calculation
- F55 Word processing
- F56 Production of drawings
- F57 Information retrieval
- F58 Other:..... F58TYPE
.....

6) Software usage:

- F61 Inhouse development of programmes
Indicate area F61AREA
- F62 Commercial packages
Indicate area F62AREA

7) Which type of information do you want from W.C. VI?

- F71 state of the art reports
- F72 short reports on ongoing R&D
- F73 collected lists of new programs
- F74 reports on new computer applications
- F75 specialized symposia on subareas - indicate area: F75AREA
.....
- F76 symposium on whole area of structural CAE F77AREA
- F77 theme on structural CAE at IABSE congress:
.....
- F78 other information: F78INF
.....
.....
.....

If you want to elaborate on some of the points please give your comments on additional sheets.

Please return completed form to IABSE, Zürich before January 31, 1986.

Appendix II. Types and operating systems for PC/Micros

Rec. no.	Type	Operating system	Rec. no.	Type	Operating system	Rec. no.	Type	Operating system	Rec. no.	Type	Operating system
70	VICTOR SIRIUS, IBM PC.	MS, DOS.	75	IBM XR, HP 150,	MAINLY MS-DOS.	80	EAGLE, HP		174	IBM-PC	MS/DOS
1	IBM			HP 1000.		199	IBM PC/XT	PC-DOS	86	COMMODORE	SINGLE USER
194	HP 9816		6	WANG	MS-DOS	105		2.10	186	IBM	
100	IBM/AT	MS-DOS	106	IBM AT		117	WANG	DOS	17	IBM XT	
107	IBM PC		118	APPLE/IBM	DOS & CPM	122	IBM XT, TEXAS PC	MS-DOS	291	IBM	MS-DOS
119	IBM XT, AT	MS-DOS	123	PC350 DIGITAL.	CP/M.	134	NEC 9801,	MS-DOS	298	IBM AT	PC-DOS 3.1
36	DEC RAINBOW	DOS	135	PC9800, N6500-M55.	MSDOS, NTOS	46	IBM AT	MS DOS	204	IBM AT	DOS 3
136	NEC, YMP.		140	HP 150		146	IBM, SPERRY	MS-DOS	228	IBM-PC/XT, FUJITSU 165,	DOS, CP/M.
141	APPLE, WANG, IBM		147	SPERRY	MS/DOS	151	IBM-PC	MS-DOS		NEC APC-3,	
148	IBM, AE M16	MS-DOS, CPM, PC-DOS.	152	IBM XT		158	DEC RAINBOWS,	CPM, MS-DOS	233	APPLE II.	
			159	HP 9816 + MACIN	DOS ETC	163	OLIVETTI M24.		245	HP	BASIC/DOS
153	IBM, APPLE, HP	MS-DOS		TOSH + IBM PC/XT.		175	HP 150B, IBM AT	DOS	52	APRICOT	MS-DOS
165	WANG		164	NEWBRAIN	CP/M-80	187	IBM PC	MS-DOS		IBM PC,	DOS 2.1
71	IBMXT/AT. HP9836		76	ALPHATRONIC, IBM	CP/M-80 CPM/ DOS		CODATA	UNIX		APPLE II E	
170	HP-150, RAINBOW	DOS, PC/M	176	IBM DATA GEN.	DOS	192	IBM AT	VERSION 3	250	STC	HANDTURNED
177	WANG PC	MS-DOS			2.1/RDOS1.9	12	IBM PC, HP 9845	DOS 3.0	257	DEC RAINBOW	DOS & CAM
182	METRIC/IBEX		181	IBM	DOS 2.1	292	IBM XT	DOS,	262	T.I. PROF.	MS-DOS
189	HP 200		188	OLIVETTI	MS-DOS	299	IBM AT	HPBASIC	269	VICTOR	MS-DOS
2	IBM HP86B	MS-DOS	7	IBM, NEC	DOS	210	HP 217	UNIX	274	RAINBOW	MS-DOS
294	UNIVAC PC20&40.	MS-DOS	293	OLIVETTI	MS-DOS	217	DEC, RAINBOW	CP/M-86/80	87	COMMODORE	BASIC (DOS)
200	HP 11/41, SHARP 1500A.		211	OLIVETTI, IBM	M-DOS-MS.D OS.	222	HP 85, IBM AT	MS-DOS	286	NEC PC 9801F,	
212	IBM AT 02	MS-DOS	218	OLIVETTI P6060		229	IBM	MS-DOS		FUJITSU FM 7,	
219	CONVERGENT	UNIX	223	IBM AT 02	DOS 3.2	234	CBM & WORDPLXE		18	IBM	
224	HP 86	HP-SYSTEM	235	IBM, BBC, SIRIUS	MS-DOS, CPM 86	47	IBM/COMMODORE		304	IBM	MS-DOS
248	IBM, OLIVETTI	PC-DOS, MS-DOS	42	OLIVETTI	MS-DOS	246	IBM COMPATIBLE	MS-DOS	328	IBM, MACINTOSH.	DOS/FINDER 5.1.
253	DEC RAINBOW,	CP/M - MS-DOS.	240	IBM	PC-DOS	251	HP 9845, APRICOT	MS-DOS	333	IBM AT, XT	MS-DOS
	IBM PC.	MS-DOS.	247	ACT SIRIUS	CPM,	263	IBM XT	DOS 2/CPM	53	MICRO-VAX 2, IBM	VAX-VMS, MS-DOS
265	PRO 350		252	MANY	MS-DOS	275	ALL TYPES				
72	MICRO 3D	MSDOS			CP/M,	287	HP 86-B, 9845-A	MS-DOS	88	IBM	MS-DOS
270	HP 87				MS-DOS,	13	NEC PC 9801	MS-DOS	19	RUF-BEE	
282	IBM/CPT/OLIVETTI	MS-DOS			UNIVAC.	305	IBM XT	DOS	54	IBM	MS-DOS
300	IBM AT, DEC RAINBOW.		259	ZENITH 89	CP/M	310	IBM XT.	DOS	89	PDP 11/23	SHARE PLUS
307	CROMEMCO	CROMIX	264	ZENITH, IBM, DEC.	DOS	317	IBM PC	DOS	20	DG 10/SP	RDOS
312	IBM-PC/AT,	PC-DOS, MS-DOS.	276	HP 86B, HP 9845A		329	IBM	SEVERAL	55	IBM-PC/XT	MS-DOS
	EAGLE-VICTOR 9000.		281	IBM AT 001	DOS	334	OLIVETTI-M24	MS-DOS	197	HP	UNIX
324	IBM	HARD DISC.	288	NEC N5200 MODEL 05.	PTOS	48	IBM	MS/DOS	115	UPTRON 5-800.	MODIFIED CP/M
38	OLIVETTI	MS DOS	318	IBM/AT&T	MS-DOS	83	IBM 5550 ETC	MS DOS	120	IBM	
336	VARIOUS	CP/M, MS-DOS, HP.	323	IBM AT	PC-DOS, P-S YSTEM	14	VAUVIN		127	DIGITAL PC 350	P/OS
4	IBM XT	MS-DOS 3.10			HP	49	APPLE II	DOS, CPM	132	NEX, IBM	MS-DOS
74	IBM		43	HP-85	HP	50	IBM	DOS	144	IBM, ATARI	MS-DOS
5	IBM + VECTOR		78	WANG	MS-DOS	16	IBM	MS-DOS	56	DEC+IBM	WPS
40	HP, WANG	DOS	9	CROMEMCO	UNIX	198	HP 150	MS-DOS	156	IBM + OLIVETTI.	
			44	APPLE II	DOS AND CPM	104	APPLE IIE	DOS, CP/M	161	IBM	
			79	TRIUMPH ADLER P1 + P3, IBM XT	CP11, DOS	128	HP 85	HP	168	HP-3000	MPE V
			10	CBM+IBM COMART	CPM+CPM	133	UNIVAC UP10E		173	IBM PC XT	DOS
			45	APPLE, HP85, PC		145	IBM-AT	PC-DOS	185	DG	AOS/VS
						51	IBM PC	DOS 3.1	91	IBM PC AT	MS-DOS
						150	OLIVETTI P6060		190	VAX 750	VAX/VMS
						157	IBM		297	APRICOT, SIRIUS	CPM, MS-DOS
						162	HP 86 B				

Rec. no.	Type	Operating system	Rec. no.	Type	Operating system	Rec. no.	Type	Operating system
215	HP 86 B		28	HP 150	MS-DOS	337	IBM AT/ APPLE -	DOS
227	IBM COMPATIBLE		302	IBM AT	MS-DOS			3.1/UGSO
232	VICTOR, SIRIUS, APRICOT, IBM.	P-SYSTEM	309	IBM/OLIVETTI	MS-DOS		II	PASCAL.
239	IBM PC	PC-DOS	326	IBM COMPATIBLE.	DOS 2.1	34	OLIVETTI	
244	IBM PC	PC-DOS	331	IBM, TI, HP. ETC	UNIX, DOS	69	CBM PC20,	MS/DOS, VMS
57	IBM XT,	PC-DOS, ZEBRA					MICRO VAX I	
	COMPUICORP		338	HP 125/VECTRA	MS-DOS			
261	IBM	MS-DOS	99	CBM,HP,OLIVETTI	DOS			
268	IBM COMPATIBLE	MS-DOS	30	IBM-PC AT,XT	DOS 3.0			
273	IBM, METRIC	PC-DOS, ZEBRA	65	IBM, OLIVETTI, SPERRY, HP.	MS-DOS			
285	IBM AT	DOS 3.0	31	MITSUBISHI, IBM	MS-DOS			
92	IBM AT	DOS 3.0	195	IBM AT02	DOS 3.0			
290	IBM	VISIOTEXTE	101	SIRIUS 1, CBM PC 10.	MS-DOS			
23	HP	NATIVE	108	APRICOT, IBM PC	MS-DOS, PC-DOS, CP/M.			
303	IBM	DOS 2.1		, XT, AT, TEK- TRONIX 4170.				
58	DEC PRO/350	VENIX (UNIX)	113		SPECTROS,M S-DOS PC-DOS			
93	HP 9836		125	IBM				
59	IBM	DOS	130	APPLE IIE				
25	DIGITAL PC-350, IBM XT.	P/OS, DOS	137	NEX PC9800				
60	IBM/RAINBOW		142	TULIP	MS-DOS			
196	SUPERBRAIN		149	APPLE	BASIC			
114	CPU IS Z80	DOS/MOS	66	TELEVIDEO 803H	CPM			
131	PC 9801 & OTHER	MS-DOS	166	HP 9816	BASIC			
138	NEX PC 9801	MS-DOS	178	COMPIS ERICSSON	CP/M			
143	CD 110	CPM	183	MANY DIFF.				
155	HP & IBM	HBP, MS-DOS	32	IBM AT	MS DOS			
61	IBM	DOS	295	CBM 8032, HP 41				
160	HP 16	BASIC	201	IBM-PC	PC-DOS			
167			208	DEC 350 PROFESS				
172	NCR 41	MS/DOS	225	IBM COMPATIBLES	MS-DOS			
184	ERICSSON PC,IBM PC, MACINTOSH, APPLE II.	MS-DOS	230	APRICOT,IBM PC	MS-DOS			
97	OLIVETTI M24	MS-DOS	237	OLIVETTI M24SP	MS-DOS			
296	NOVA 4/X	RDOS	242	IBM PC & COMPAQ, CROMEMCO,	MS-DOS, CROMIX, CPM80, CONCUR- RENT CP/M.			
231	HP + OLIVETTI			INTERTEC SUPER- BRAIN, LSI OCTO PUS.				
238	HP 200 SERIES	217	249	VARIOUS	VARIOUS			
243	IBM PC/XT, LSI	PC-DOS, LSI, OLIVETTI.	254	IBM AT,XT	DOS			
	M3, OLIVETTI P6060	OLIVETTI.	67	TELEVIDEO				
255	IBM		266	OSBORNE. IBM AT	CPM, MS-DOS.			
62	MICROVAX II	VMS	271	IBM AT, XT	DOS 3.1			
260	COMPAQ, OLIVET- TI P6060, IBM	MS/DOS, OLIVETTI O.S., MS-DOS.	283	SHARP PC 1500	SHARP			
	PC/XT.	MS-DOS.	301	IBM AT	MS-DOS			
267	HP 9845T	BASIC HP	308	CROMEMCO, SVI	CP/M			
272			313	OLIVETTI M24	MS-DOS			
279	VICTOR	MS-DOS	325					
			68	BURROUGHS				



Appendix III. Types and Operating Systems for mini's

Rec. no	Type	Operating system	Rec. no.	Type	Operating system	Rec. no.	Type	Operating system	Rec. no.	Type	Operating system
35	VAX 750	VSM 4.2	240	PRIME	PRIMOS	262	VAX 11/780	VMS	62	VAX 11/750	VMS
194	NCR 8430		252	PRIME	PRIMOS,	274	VAX 8600, VAX	VMS, TOPS 20	279	PRIME	PRIMOS
119	VAX 780	MS-DOS			PRIMIX.		11/780, DEC 2065.		284	HP-1000	RTX
124	OLIVETTI, SHARP	BASIC	264	DG, VAX, IBM	VARIOUS.	321	PRIME	PRIMOS	28	PRIME 550	PRIMOS
36	DEC PDP 11/24	RSX 11 M	77	HP 3000/48,	MPE,	328	PDP 11/73	TSX T	302	PRIME	PRIMOS
136	YHP				MICOS.	88	VAX 11/780	VMS	314	WANG 2200C.	
141	HARRUS			MCS-COMPUTER,	PRIMOS.	90	OLIVETTI P6040	BASIC	331	VAX 750, MICRO-	UNIX
153	APOLLO, DOMAIN.	CAD-DRAUGH		PRIME 2250.		103	PRIME 2250.02	PRIMOS		VAX.	
		TING.	288	ACOS 410		127	DIGITALPDP11/23		63	VAX + DEC	VMS +
165	OLIVETTI-P-	BASIC	318	PRIME	PRIMOS	132	PRIME	PRIMOS		TOPS20	
71	NIXDORF		323	DEC PDP 11/34.	RSTS-E.	144	VAX, GOULD	VMS, UNIX	338	HP 9000	UNIX
170	HP-9836	BASIC,	9	DG-NOVA	RDOS	56	VAX+DEC	VMS+TOPS 20	29	HP 9000	BASIC-OS
		PASCAL	10	PRIME 550	PRIMOS	156	PRIME 2250,250	PRIMOS	99	HP	DOS
177	WAMB		80			161	HP		65	PD11, VAX11/750,	VMS
2	VAX (3)	VMS	11	DIGITAL VAX 730	VMS	168	HP-1000	RTE A 1		SPERRY, HP-1000	
294	NORTH-STAR	CP-M &	199	IBM	23	173	NIXDORF 8860		31	VAX 750	VMS
		MS-DOS.	110	PSI (IBM COMP.)	FLOPPY	185	DG	AOS/VS	101	PRIME	
219	PRIME	PRIMOS			DISC	91	PRIME 750	PRIMOS	108	VAX 11/750, VAX	VMS, AOS.
241	DEC VAX 11/730	VAX/VMS	129	HP 9000-550	UNIX 5.0	190	DEC-10	TOPS-10		11/780 CLUSTER,	
248	HARRIS H700	VOS	146	VAX, NORD	VMS,	297	VAX 11/750	VMS		DG MV 10000.	
253	DEC VAX 11/730	VMS V4.2			SINTRAN	220	CODATA	UNIX	125	VAX-11	
265	VAX		151	VAX 11/780	VMS	227	PRIME		142	VAX,P4500	VMS
72	BULL MINI 6/74	DOS MOD	158	VAX 11/730	VMS	239	DEC VAX,HP 3000	VMS, MPE	66	MICROVAX I	VMS
		400	163	PRIME	PRIMOS	57	PRIME	PRIMOS	166	PDP-11/PRIME	RT
277	PDP11,VAX11/750	RXS-11M,VA	175	S/36 IBM	SPP	261	VAX			11,JJ/PRIM	
		X/VMS	12	PRIME 2250		268	VAX 750	VMS,		OS	
282	PRIME/NIXDORF	PRIMOS/8870	205	OLIVETTI P6066	F.DOS			VMS/16DS	171	HP-9826	BASIC 2.1
3	DATA GEN.EC.130	AOS	210	DG NOVA 4X	RDOS	285	HONEYWELL		178	NORD 100,500	SINTRAN
300	VAX/780		229	PRIME 9750	PRIMOS	290	PRIME 650	PRIMOS IV	183	MANY DIFF.	
307	PDP 11/34	RSX	234	HP 1000 XL	RTE/XL	315	PRIME 750	PRIMOS	32	PDP 11/45	PSX 11 M
		11M/3.0	246	VAX11750/PRIME	VMS/PRIMOS	327	HP 9816	BASIC	213	OLIVETTI,DICHI	N24,2000
312	PRIME 400 & 550	PRIMOS		750 & 9750.		58	PDP 11/23	XENIX	225	DEC VAX/DEC 10	VMS-TOPS-1
38	HP 1000	RTE 6	263	ALL TYPES				(UNIX)		0	
73	HP 86B		82	OLIVETTI	MINI-BASIC	93	3000	MPE	230	PRIME,VAX	PRIMOS,VMS
39	SIEMENS PC-MX2	XENIX	13	HP-9000	UNIX	24	ECLIPSE	RDOS	249	DEC VAX	VMS
		(SINIX)	48	PRIME 450	PRIMOS	94	DEC	TSX	67	VAX	
74	IBM		49	VAX		25	HP 9845B		278	DIGITAL PDP 11	RT 11
6	VAX 750		15	HP 3000		95	HP 41 CV		33	COUVERGENT TECK	UNIX
123	PDP 11/60, PDP	RSX 11 M.	85	PRIME 250	FORTRAN	126	HP 9020		308	CVI	CP/M
	11/750.		16	DEC PDP 11	BR11, RSX	131	VAX 11/750	VMS	69	VAX 11/780,	VMS
147	VAX/ND	VMS/SINTRAN	198	HP 217		138	FALCOMU-200	U-MOS			
152	IBM 370		133	UNIVAC SYSTEM11		61	TI 990	DX10		VAX 11/730 2	
159	HP 9000 MODEL	UNIX	145	PRIME 550	PRIMOS	179	HP			PCS, PRIME 2250	
	550.		169	HP 41 CX		184	VAX 11/750	VMS			
164	VAX (DIGITAL)	VMS	174	MV-4000.D.G.	AOS/VS	96	PDP-11/23,	V.4.1			
76	DATAGEN. MV4000	AOS/VS	186	PRIME			RSX-11, V.4.1				
193	HP/DATA		191	PRIME	PRIMOS	27	HP 9000	UNIX			
7	VAX	UNIX	291	NORD, HP	SINTRAN,			(HP-UX)			
206	OLIVETTI	MS-DOS			RTEA	97	PCS-CADMUS	UNIX			
235	PRIME, VAX	PRIMOS,UNIX	298	PRIME 750	PRIMOS	296	VAX 855	VMS			
			204	HP 86B		202	OLIVETTI S6000	EMOS			
			228	NORSK DATA ND-	SINTRON.	209	VAX 11/750	VMS			
				100/530/570.		214	HP				
			245	VAX, PRIME	VMS,						
					PRIMOS						
			250	DEC VAX 11/780	VMS						

Appendix IV. Types and Operating Systems for mainframes

Rec. no.	Type	Operating system	Rec. no.	Type	Operating system	Rec. no.	Type	Operating system
35	1100		122	IBM S/38	CPF	256	VAX 751	VMS
1	IBM 4331	VU CMS	134	IBM 4341	VM	273	PRIME 550/850	PRIMOS
36	CYBER		146	UNIVAC	EXEC 8	320	ESER	OS/MVT
136	IBM 4341		151	DEC 10	TOPS 10	59	PRIME	
141	ICL		292	ODRA-1305 (ICL-1900), RIAD-32	BEORGE-3, DOS/ JS & OS/JS.	60	VAX8600/VAX780	VMS
165	DATA GENERAL-ECLIPSE S/200.					95	PRIME 550/II	
2	DEC 10	TOPS 10				26	NAS	MVS
294	UNIVAC S/80	OS/3		(IBM 360).		109	ICL 2988	VME
200	PDP 1144		210	DEC VAX 11/785	VMS	114	DEC 2050	TOPS 20
207	NCR		229	IBM 3031-8	OS/VSI, DOS/VSI, MUSIC, VM, VMS.	131	FACOM-M340S	FSPX8
224	UNIVAC, VAX 11/780.					138	FALCOM M-382	OSIV/F4
265	AS 9000					143	CDC	NOS 3.1
72	IBM 3081X	OS MVS				61	VAX-11/750	VMS
3	DATA GEN.EC.130	AOS	246	SEQUENT 8000	UNIX	179	IBM	
307	UNIVAC 1100	EXEC 8	251	DEC 20		184	IBM 3081	MVS/TSO.
38	IBM 3033, 4341	MVS/TSO, VM/CMS	263	IBM 4083		27	CDC 170-720	NOS
			280	UNIVAC	1100/62	97	CDC-CYPER	NOS 2
336	SPERRY	OS 1100	13	IBM-3083J	MVS	296	CYBER 180-577	NOS
39	SIEMENS 7500		310	IBM 4443 (.)	CMS	267	IBM 370	FORTRAN
75	IBM 4361 MOD 3		329	BURROUGHS 6700.	SEVERAL	279	CYBER 175	NOS 2.2
6	CDC825, IBM3083	NOS/BE, MVS/XA	14	HITAC M-240D	VOSI/ES	284	CDC CYBER	
			49	IBM		331	DEC 20	TOPS
111	IBM 370/155		16	DEC VAX, IBM	VMS, VM	65	CYPER 180	NDS/VE
123	IBM 3081, HONEY	OS-VS, GERT2.	121	GOULD	UNIX	195	VAX 11-780	VMS
			133	UNIVAC 1100/71		101	IBM	
	WELL DPS/76.		51	IBM 3130	VSPC, APL	108	IBM 4361.	VM.
135	IBM 3081	MVS	157	PRIME 350	PRIMOS	130	PRIME	
41	IBM 3081 X 2	MVS, XA	174	IBM 4331	DOS/VSE	142	SPERRY	EXEC 8
147	UNIVAC		204	IBM/36	SSP/36	178	IBM	DOS
152	IBM 3033		221	OLIVETTI P 6060	BASIC	225	CDC CYBER	SCOPE
159	SPERRY UNIVAC	EXEC 8 + UNIX	228	IBM 3031/3083.	CMS.	283	DEC-10	TOPSIO
			233	2903		308	UNIVAC 1100, DELTA, IBM, FACOM.	
293	CDC, IBM	NOS, MVSSP	245	DEC 10	TOPS 10	313	PRIME 2250	PRIMOS 19.3.7.
206	PRIME		250	IBM 3031	OS/VSI	68	HP 1000	RTE-A
235	IBM 4381	CMS	262	NAS/9160		337	IBM 3031	VM-CMS/DOS
42	SIEMENS	BS 2000	269	SIEMENS	BS2000			
252	AMDAHL	VMS	286	FACOM M360				
264	CDC 850, DEC 20	NOS, TOPS.	18	CTM	BASIC			
281	PDP 11	PX 11	304	CDC, PRIME, ETC.	FORTRAN			
288	XOA 650	ACOS-6/MVX	316	WANG VS 65	6.40			
8	CDC, IBM		321	DATA GENERAL	AOS			
306	CYBER 72, 172,	NOS/BE, NOS2.	53	VAX-785	VAX-VMS			
	173. DEC 10.	TOPS-10.	88	IBM 3083/CRAY 1	VM/COS			
335			54	VAX 11/780	VMS			
78	CYBER	NOS	21	IBM 3081	VM/CMS			
9	IBM 4341	VMS	132	HITACHI, IBM	VOS 3			
79	DATA GEN.MV4000	AOS/VS	161	PRIME				
80			168	IBM 4341	VM/SP CMS			
105	HONEYWELL BULL 64 DPS-2.	GCOS	173	IBM 4341	MVS			
			190	CYBER 170-720	EMOS/SCOPE 3.4.1			
			22	PDP 11/05	RSX			
			203	VAX 11/750	VMS 3.			
			244	IBM 3084Q	MVS/XA			



Appendix V. Types of CAD systems

Rec. no.	Type	Rec. no.	Type
1	SKOK	228	IBM 5080/5060 +
100	HP 9836 C5		NORSK DATA
141	AUTOCAD		CADAM.
153	APOLLO,HP.	245	PERO CADRAW,
165	CALCOMP 960		COMPUTERVISION,
182	GDS, PRIME		ARC-GDS.
2	GDS	52	CALCOMP 25,UNIX
219	SPEEDIKON	257	IBM AT,AUTOCAD.
37	HP 9029	269	AUTOCAD
241	GIPSYS-2D DRAFT	274	DOGS, EUCLID.
248	PAFEC DOGS.	321	PRIME-MEDUSA.
265		328	APOLLO
72	ASSIGRAPH	333	AUTOCAD
277	DOGS	54	HP
3	DATA GEN.EC.130	55	IBM-PC/XT
300	INTERGRAPH	132	CAPAM CALMA
38	CADAM	144	MICRO DUTCH
75	HP 1000	56	EUCLID + DOGS
123	AUTOTROLL.	156	CEAOS/HP A900
135	IBM 3083 &	161	GDS
	CADAM.	173	VAX
147	APOLLO-MICROVAX	203	MEDUSA/VAX
235	COMPUTER VISION	239	FEAL GIPSYS
240	GIPSYS	57	INTERGRAPH
252	PRIME	256	INTERGRAPH
264	UNIGRAPHICS,	268	INTERGRAPH
	CADAM, AUTOTROL,	273	INTERGRAPH/VAX
	AUTOCAD,	290	TEKTRONIX 4109
	CATIA, BDS, GDS,	60	EUCLID/DOGS
	ETC.	26	CDC
8		102	IBM
306	VERSATEC	179	INTERGRAPH/VAX
78	ICEM/DDN	184	CADAM
9	CASCADE	260	AUTOCAD ON IBM
80			PC/XT.
134	CADAM	63	EUCLID + DOGS
146	CYBER 180-810	65	DAISY
163	PRIME	31	EUCLID MX-I
175	TEKTRONIX	195	MEDUSA
299	IBM-PC	108	DOGS (VAX),
205	PRIME		TECHNI CAD
229	MEDUSA		(TEKTRONIX),
246	GDS		EASYDRAF (HP),
263	MANY DIFF.		AUTOCAD (IBM-
13	MENTAT		APRICOT).
14	IBM 4361 CADAM	142	DOGS (PAFEC)
49		66	DOGS
16	DEC VAX	166	MEDUSA
198	SEVERAL SYSTEMS	183	SOME DIFF.
133	UNIVAC SS-3E	208	BOCAD/DEC 11/
145	REHACAD-		780 VAX.
	AUTOTROL-APOLLO	230	INTERGRAPH
186	MEDUSA	249	GIPSYS
		67	VAX/DOGS/OWN.DE
		69	DOGS-2D

Appendix VI. Other applications

Rec. no.	Other applications	Rec. no.	Other applications
36	ESTIMATING, QUANTITY AND COST	274	CAD-TECHNIQUES.
	SURVEYING, BILL OF QUANTITIES	321	DESIGN
136	LABORATORY AUTOMATION.	333	STRUCT ANALYSIS & DESIGN.
170	AUTOMATION OF STRUCT. TESTING	88	FINITE ELEMENT ANALYSIS,
	AND DYNAMIC LOAD TESTING.		GRAPHICS.
294	TOLL, APPRAISEMENT/CAPACITY	21	HONE COUNTRY COORDINATOR
	EXPROPRIATIONS AND SURVEYS.		(HONE=IBM INTERNATIONAL
207	EVALUATION AND ANALYSIS OF LAB		PRODUCTIVITY TOOL FOR
	ORATORY TESTING MATERIALS		TALESMEN AND SYSTEM ENGINEERS)
241	PHYSICAL LAND SURVEYS.	25	SCIENTIFIC RESEARCH
72	CIV. ENG.	131	LABORATRY AUTOMATION (CONTROL,
307	STRUCT. AND FLUID MECHANICS		DATA-GATHERING, MONITOTING &
	ANALYSIS.		DATA-PROSESSING).
312	SOFTWARE DEV, ACC.	155	PROJECT ANALYSIS-FEASIBILITY
324	DESIGN		STUDIES.
40	CAT COMPUTER AIDED TESTING	184	PROG. DEV. COMPUTER CONFERENCE
140	COLLECT DATA		SYSTEM
152	TEACHING	27	SOFTWARE DEV.
159	TEACHING, STRUCT. ANALYSIS +	97	SOFTWARE-DEV.
	DESIGN, RESEARCH.	284	SCIENTIFIC CALC. FOR STRUCT.
176	ACCOUNTING/DATABASE		DESIGN., STATISTICAL ANALYSIS
211	STATIC COMPUTATION, GEODETIC		OF DATA.
	SURVEYING.	331	RESEARCH, EDUCATION.
235	SIMULATION	65	PRODUCTION AND RESEARCH OF
240	ACCOUNTANCY.		EXPERT SYSTEMS
252	TEACHING	195	TENDER DOCUMENTS.
80	SCIENTIFIC WORK	101	STRUCTURAL ANALYSIS, COMPUTA-
105	STRUCT. ENG.		TIONEL MECHANICS, INSTRUCTION.
110	ENG. DESIGN OF STRUCTURES	108	COMPUTER BASED EDUCATION (CAI),
163	SPREAD SHEETS		3D MODELLING CAM
292	DEV. OF COMPUTER PROGS. FOR	142	PRE AND POST-PROCESSING IN
	PROBLEMS OF NONLINEAR STRUCT.		DESIGNING CONSTRUCTIONS.
	MECHANICS.	171	INTERACTIVE DESIGN.
210	TESTING IN THE LABORATORY.	225	PROGRAM DEV.
246	MATHEMATICAL MODELLING.	308	STRUCT. DESIGN.
263	CLIMATE CONTROL IN BUILDINGS,		
	SECURITY, COMMUNICATIONS.		
310	I HAVE MOUNTED THE STRUDLE OF		
	UPM FOR SCHOOL, CONTRIBUTED TO		
	IMPLEMENTATION OF STRUCT. PRO-		
	GRAM FOR XT FOR TEACHING, BROUGHT		
	PROGS. FROM MY PRECEDENT		
	RES, ROADS DESIGN, TOPOGRAPHY,		
	PHOTOGRAMETRY, STUDIES LOCAL		
	CADAM IMPL. INTENDED WITH UPM		
	PROGRAMS.		
145	EDUCATION		
169	FINANCIAL PROGNOSES.		
186	ESTIMATION		
291	HYDRAULIC PROCESSING, DATA		
	RETRIEVAL FROM VARIOUS		
	INSTRUMENTS.		
298	ACCOUNTING, DATA ACQUISITION.		
228	(STUDENT) RESEARCH.		

Appendix VII. Application Areas

Rec. no.	In house development	Commercial packages
35	LINEAR AND NONLINEAR FE.	
70	CONSTRUCTION COST MANAGEMENT	STRUCTURES COMPUTING
1	WATER ENGINEERING	BUDGET,COSTING,PAY ROLL
	STRUCTURAL ENGINEERING	
194	ADMIN.	ADMIN./STATICS
100		CAD, STATIC
107	STRUCT. ANALYSIS & DESIGN	
112		
119	TRANSMISSION LINES ETC.	FINITE ELEMENTS + MATHEM.
124	CALC.	ADMINISTRATION
36	VARIOUS	VARIOUS
136	DEPENDING ON SPECIAL NEEDS.	DEPENDING ON SPECIAL NEEEDS
141	STRUCT. ANALYSIS, INSTALLATI ONS BULDING PHYSICS.	ADMINISTRATION
148	STRUCT. ENG., BRIDGE DESIGN.	WORD PROCESSING.
153	ENG. CALC. STRUCT.HYDRAULICS.	STRUCT, HYDRALICS, ROADS, SU RVEYING, FILING/SORTING, FINANCIAL.
165	STRUCT. AUTOPISTAS	
71		
170	DATA ACQUISITION, CALC.	WORD PROCESSING, DATA BASE
177	TENDERING, PROJECT MANAGING	DATA BASES, STATIC ANALYSIS.
182	CALC. (TECHNICAL)	
189		CUBUS-PROG. ZURICH.
2	STRUCTURAL ANALYSIS & DESIGN. EXPERIMENTAL DATA PROCESSING.	STRUCTURAL ANALYSIS & DESIGN
294	ADMINISTRATION, BUDGETTING, TOLL, APPRAISEMENT, EXPROPRI ATIONS AND SURVEYS.	WORD PROC., CALC, AND DESIGN
200	STRUCT. ANALYSIS, HYDRAULICS	STRUCT. ANALYSIS.
207	TECHNICAL EVALUATION AND ANA LYSIS OF LABORATORY TESTING OF MATERIALS.	ADMIN.
212		PROJECT AND CONSTR. MANAGEM.
219	FINITE ELEMENT ANALYSIS (PROGRAM FLASH).	CAD.
224		MARC,FLASH,STATIC,MAPPER, LOTUS
37		FORMWORKS AND REINFORCEMENT DRAWINGS WITH BILL OF QUANTITIES
236		NUMEROUS
241	ENG: ANALYSTICAL MODELLING	PAFEC "DOGS" (GRAPHIC),
248	MOST AREAS OF CIV. ENG.	HENCO "INFO" (DATA BASE)
		ENG.,MIS,WORD PROC.
253	ENG.	ALL
265	ALL	20 M. BYTES.
72	10 M. BYTES.	
270	STRUCTURES.	
277		

Rec. no.	In house development	Commercial packages
282	DYNAMICS OF STRUCTURES/ CONTROLLING	
289	CALC.	WORD PROC.
3	STRUCTURAL ENGINEERING, GENERAL 3D GRAPHICS	
300	ALL	LARGE SYSTEM SOLVERS.
307	STRUCT. AND FLUID MECHANICS ANALYSIS.	STRUCT. MECHANICS.
312	BRIDGE/STRUCT. ANALYSIS/ DESIGN.	BRIDGE ANALYSIS/DESIGN.
319	ADMINISTRATION & INFORMATION RETRIEVAL.	ADMINISTRATION & INFORMATION RETRIEVAL.
324	STRUCT. - ROAD WORK.	
38	STRUCTURAL ANALYSIS	FINITE ELEMENTS DIAGRAMS
336	ADMIN., BUDGETT., PLANNING & STEERING, CALC., WORD PROC., PROD. OF DRAWINGS, INFO. RE- TRIEVAL.	ECONOMY, DEV. TOOLS.
73		STRUCT. CALC.
4	FINANCIAL MANAGEMENT, COSTING, STRUCTURAL DESIGN	WORD PROCESSING, INTEGRATED PACKAGE (OPEN ACCESS)
39	STRUCTURAL OF BRIDGES CALCULATION CONCRETE, STEEL AND GEOTECHNICAL CALCULATION S - STEERING OF BRIDGES- MAINTENANCE (ALSO HEAVY TRAF FIC)	STRUCTURAL CALCULATIONS (SAP-NONSAP) (*) (*) WORD PROCESSING DATABASE
74		
5	TIMBER DESIGN	STRUCTURAL DESIGN
40	CALCULATION + CAT	
75	STRUCT. ANALYSIS FOR STEEL CONSTRUCTION AND OFFSHORE STRUCTURES	WORD PROCESSING,TABULATORS, DATA-BASE
6	STRUCT ANALYSIS, PSC DESIGN FOOHHG DESIGN, BRIDGE INVENTORY	ANALYSIS OF COMPLEX STRUCTURES (F.E., FOLDED PLATE ETC.)
106	DESIGN OF CONSTRUCTION OF CIV. ENG.	ACCOUNTS DEPARTM. OF BUREAU.
111	ANALYSIS & DESIGN OF INDUSTRIAL STRUCTURES.	COMPUTER AIDED ANALYSIS, SAP IV, VI ETC.
118		
123	STRUCT.ANAL., THERMAL ANAL., HYDRODYNAMICS	
135	SUMISAP (NONLINEAR FEM SYST.) ETC.	MSC-NASTRAN (GEN. PURPOSE FEM).
41	BRIDGE AND STRUCTURAL ENGINE ERING	
140		
147	STRUCT. ANALYSIS - FEM	STRUCT. ANALYSIS - FEM - GRAPHICS.
152	FINITE ELEMENT APPLICATIONS.	"ICES-STRUDL",CAD
159	STRUCT. ANALYSIS + DESIGN.	SPREAD SHEETS, DATABASES, WORD PROC.
164	PRESTRESSING CONCRETE BRIDGES	WORD PROC.



Rec. no.	In house development	Commercial packages
76 176	CALC. PROBLEM ORIENTATED DATA BASE	ALL ACCOUNTING/BUDGETTING/WORD PROC.
181 188 193		
7 293	STRUCTURALBEHAVIOUR RC, PC NONLINEAR FINITE ELEMENT ANALYSIS, GEN. ANALYSIS OF ENG. DATA.	WP, STRUCTURAL ANALYSIS MATHEMATICS, PLOTTING, STATISTICAL.
206		STRUCT., SURVEY, ADMIN., WORD PROC.
211 218	SMALL PROGR., DESIGN, COMPARISON OF BANKERS.	CIV.ENG., STRUCT. DESIGN, SOIL MECHANICS, ROAD PLANNING.
223 235 42	ALL IN 5. STRUCTURAL ANALYSIS	STRUCT. ANALYSIS, CLEARSOFT. ALL IN 5. NUMERICAL ALGORITHMS, STATISTICS.
240	STRUCT. ANALYSIS.	HIGHWAY DESIGN, COMPUTER-AIDED DRAFTING
247	CIVIL/STRUCT. ENG.	WORD PROCESSING/STRUCT. ANALYSIS.
252	STRUCT.ANALYSIS, STRUCT. DESIGN, AI, ETC.	STRUCT.ANALYSIS, CAD, ETC.
259	STRUCT. DESIGN.	WORDSTAR, SUPERCALC, CP/M, MBASIC.
264 77 276	ENG., FEM, ES, NUM.ANAL., ETC. ALL AREAS REINFORCED CONCRETE COLUMNS. PROPERTIES OF AREAS, FINITE ELEMENTS (RECTANGULAR ELEMENT, PLATE BENDING).	ENG., FEM, GRAPHICS. FINANCIAL PLANE FRAME
281 288 8 306	STRUCT. ANALYSIS. STRCT, ANA, & DESIGN STRUCT. ANALYSIS AND DESIGN.	STRUCT. ANALYSIS, ACCOUNTING CAD, WORD PROC. STRUCT. ANALYSIS AND DESIGN, MATH.
318	FINANCIAL MANAGEMENT/BILLING /PAYROLL.	ENG. STRUCT HIGHWAY, WORD PROC., STRUCTURES, ETC.
323 43 335 78 9 44	ADMIN. (DATABASE), CIV. ENG. CALC. AND ADMINISTRATION. CALCULATION STRUCTURAL ENGINEERING STRUCTURAL DESIGN - CALCULATION	ACCOUNTING. STRUCTURAL DESIGN STRUCT. ANALYSIS. CALCULATION, CAD, ADMINISTRATION, ETC WORD PROCESSING, ETC WORD PROCESSING.
79 10 45	ADMINISTRATION, BUDGETTING STRUCTURAL ENGINEERING	CALCULATION, WORD PROC. WORD PROCESSING, ADMINISTRATION. BUDGET
80 11	BUILDING SCIENCE,	

Rec. no.	In house development	Commercial packages
199 105	CALC. STRUCT., SURVEYING & ROAD DESIGN	ADMIN. WORD PROCESSING & DATA BASES
110	MATRIX (STIFFNESS) FOR SPACE FRAMES, ROAD EMBANKMENT ETC.	
117	STRUCT. CALC. ON ROAD & BRIDGE ENG. (FOR INSTANCE: BENKELMAN BEAM ANALYSIS, STRESS CALCS, FOR HOLLOW CONCRETE COLUMNS (R.C.), SIMPLIFIED DYNAMIC ANALYSIS OF BRIDGE SUPERSTRUCTURES.)	
122	PLANNING-STORE CONTROL-COST TRACKS	ADMINISTRATIVE NEEDS-STRUCT. ENG.
129 134	FINITE ELEMENT ANALYSIS STRUCT. ANALYSIS, MATERIAL TAKE-OFF.	F.E. - CAE STRUCT. ANALYSIS.
46	HYDRAULICS, FLOOD FLOWS, GUYED TOWERS	CADD, SCS HYDROGRAPH STUDY.
146	COMPUTER AIDED LEARNING, FINITE ELEMENTS IN STRUCTURAL ENG.-LINEAR/NONLINEAR, DESIGN/DIMENSIONING OF REINF. CONCRETE	FEM.
151	STRUCT. ENG., HYDRAULICS, DAMS, ROADS, CONSTRUCTION.	IMSL, SSP, GKS.
158	TECHNICAL PRGS. & CERTAIN ADMIN. PROGS.	
163 175 81 180 187 192	TRANSPORTATION, STRUCT. ADMIN. CIV. ENG.	ENG. DATABASE, WORD PROC.
12 292	ENGINEERING/CALCULATIONS CONTIXXXX MECHANICS, STATIC AND DYNAMIC FINITE ELEMENT, ANALYSIS OF STRUCT. (1, 2, 3-DIMENSIONAL)	CIV. ENG., STATIC. ENGINEERING/CALCULATIONS
299	STRUCT. ANALYSIS AND DESIGN PROGRAMS.	SAP-4
205		ADMIN., CALC., WORD PROC., PRODUCTION OF DRAWING. WORD PROCESSING/ADMIN.
210	STRUCT. ENG./RESEARCH/ TESTING.	
217 222	CALC., MATERIAL LISTS. STATICS, ACOUSTICS (NOISE REDUCTION).	ADMIN. ADMIN., STATICS (E.G. FE), BUDGETTING.
229 234 47 246	STRUCT. ANALYSIS & DESIGN STRUCT. CALC. MINOR STRUCTURAL. MATHEMATICAL MODELLING.	STRUCT. CALC. STRUCTURAL. GDS, ADAS, VISION, INFO, PATRAN, STRESS, PIPS.

Rec. no.	In house development	Commercial packages
251	STRUCT./CIV. ENG. ANALYSIS/DESIGN.	BUSINESS SOFTWARE
258	SAFETY & RELIABILITY/STRUCT.	
263	ALL AREAS	ALL AREAS
275	REINFORCED CONCRETE COLUMNS, PROPERTIES OF AREAS, FINITE ELEMENTS (RECTANGULAR ELEMENT PLATE BENDING.).	PLANE FRAME
82		ENG.
280	FEM PROGRAMMES,	FEM PROGS., MATH. PROGS.
287	STRUCT. CALC., DATA BASE.	
13		
305	SOIL, STRUCT., ACCOUNTING.	VISICALC, VISISCHEDULE, LOTUS, D-BASE, STRESS.
310	SIMULATION (CONTROL OF QUALITY OF CONCRETE), STATISTICS (OTHERS), PLANNING OF EXPERIMENTS, MATHEMATICS. CIV. ENG.	NOT ME. SYSTEM FOR MANAGEMENT OF PUPILS RECORDS AND ADMINISTRATIVE, WITH UPM COMPUTER AT ETS AGRONOMOS. ADMINISTRATION, C.E.
317		
322		
329	STRUCT. ENG.	STRUCT. ENG.
334		BUILDING ENG. & OFFICE.
48	HIGHWAY ENGINEERING	STRUCTURAL & MUNICIPAL ENG'G SURVEYING, BUDGETTING (SYMPHONY & LOTUS 123)
83		
14	CIVIL, ARCHITECT, ELECTRICAL ENGINEERING	MECHANICAL ENGINEERING
49		PC WORD PROC.
84		
15	STRUCTURAL ENGINEERING, PROJECT MANAGEMENT	WORD PROCESSING, SPREADSHEET
50		SLAB, FRAME ANALYSIS, SLAB DESIGN
85	STATICS	FE.STRESS, FLASH,SAP IV, ETC
16	ALL AREAS OF 51	STATICS
198	STRUCT. ENG./HEAT TRANSFER. ENG.	CAD/STATISTICS/TEXT EDITING.
104		
116		
121	STRUCT. ANALYSIS	F.E. PROGS.
128	ENG. CALC.	ENG. CALC.
133	STRUCT. ANALYSIS AND DESIGN, CAD SYSTEM.	
145	EDUCATIONAL	GENESYS (FINITE ELEMENTS).
51	STRUCTURAL ENG.	
150	SMALL PRGS.-STRUCT. ANALYSIS DESIGN OF REINFORCED CONCRETE.	STRUCT. ANALYSIS.
157	ROAD DESIGN, STRUCT. ENG., HYDRAULIC.	STRSS, STRUDEL.
162	R.C. & PRESTRESS DESIGN.	STRUCT. ANALYSIS,
169	CALC. COOLING TOWERS & FENDERING OFF-SHORE PLATFORMS.	

Rec. no.	In house development	Commercial packages
174	ADMIN.-PLANNING & STEERING-CALC.	CALC. WORD PROC.
86	SHELL ANALYSIS	STRUCT. ANALYSIS (CIV. ENG.)
186	PLANNING, ESTIMATION	ALL OTHERS
191	STATICS, DYNAMICS	STRUCT. ANALYSIS.
17		
291	HYDRAULC PROCESSING, DATA RETRIEVAL.	WORD PROC., SPREADSHEET, GRAPHICS, STRUCT. CALC.
298	INFORMATION RETRIEVAL DATA ACQUISITION.	FINITE-ELEMENT ANALYSIS, SPREADSHEETS, ACCOUNTING.
204		STATIC, ADMIN, COST PLANNING, INTERNAL ADMIN.
216	SERVICE BUREAU	SERVICE BUREAU
221	STATIC CALC.	STATIC CALC.
228	ALL ENG. FIELDS.	ALL ENG. FIELDS.
233	STEELWORK DESIGN AND CODE PREPARATION AND CALIBRATION.	
245	ADM., BUDGETTING, CALC., WORD PROC., PROD. OF DRAWINGS, INFO. RETRIEVAL.	CALC., WORD PROC., PROD. OF DRAWINGS, INFORMATION RETRIEVAL.
52	CONCRETE BEAM DESIGN, FRAME ANALYSIS, WIND, EARTHQUAKE ANALYSIS, CONCRETE COLUMN DESIGN.	CONCRETE SLAB DESIGN, LOTUS 1-2-3.
250	STRUCT. ENG.	STEEL BEAM & COLUMN DESIGN, WORDSTAR.
257	STRUCT. ANALYSIS, ACCOUNTING	COMPOSITE BEAM DESIGN, PEACH TEXT.
262	EDUCATIONAL SOFTWARE-ANALYSIS AND DESIGN.	BUILDING STRUCTURES.
269	HYDRAULIC ANALYSES, CONSTR. MANAGEMENT.	STRUCT. ANALYSIS, CAD, WORD-PROC, DATA BASE, MANG.
274	STRUCT. (CIV.ENG., MECHANICAL, INFORMATICS,ETC.).	SPREADSHEETS, WORD PROC., COMPILERS, DATA-BASE MANAGEMENT, FINITE ELEMENT ANALYSIS.
87		STATIC & DYNAMIC ANALYSES, PROJECT NETWORK ANALYSIS.
286	STRUCT. ANALYSIS. (STATIC, DYNAMIC, LINEAR, NONLINEAR.	
18	INFORMATION SYSTEM	STATICS FOR BUILDING
304	STRUCT. ENG.	STATIC
316	CALC.	STRUCT. & BRIDGE ENG., WORD PROC., ADMINISTRATION/ACCOUNTING.
321	STRUCT., DRAFTING.	ADMINISTRATION, BUDGETTING, WORD PROC.
328	ENG., ADMIN.	STRUCTURES
333		ENG., ADMIN.
53	CIVIL ENG.: STRUC. ANALYSIS, P.C., PC., STEEL DESIGN, SOLID MECHANICS	STRUCTURES, DATABASE, SPREADSHEET.
88	STRUCTURAL ANALYSIS.	
19		ADMINISTRATION



Rec. no.	In house development	Commercial packages
54	CONSTR. MANAGEMENT INFORMATION SYSTEM	CONSTR. MANAGEMENT
89	FEM	FEM, STRUCTURAL ANALYSIS.
20		SPACE FRAME, FEM (STRUCTURAL)
55		SAP5, AUTO CAD FOR DESIGN OF ARCHITECTURES AND STRUCT.
90		STATIK, MASSIVBAU, STAHLBAU, HOLZBAU.
21	SYSTEM CONFIGURATIONS, DESIGN TOOLS, OFFICE SYSTEMS, --	
197	STRUCT. CALCULATIONS.	ADMIN., WORD PROC.
103	STRUCTURAL ENG.	
115	STRUCT. ENG.	
120	CALCULATION (18 PRGS.)	WORD PROCESSOR + SOME CALC. (SPACE FRAME F.I.)
127	STRUCT. ANALYSIS.	STRUCT ANALYSIS, ADMINISTRATION.
132	STRUCT. ANALYSIS, OPERATIONS RESEARCH, BUDGETTING, ETC.	STATISTICAL PROCESSING, DRAWINGS, DATABASE CONTROL ETC.
139		
144	TECHNICAL/CAD-CAM	COMMERCIAL
56		ADMINISTRATION
156	CIV./STRUCT. ENG.	CIV./STRUCT. ENG.
161	STRUCT. ANALYSIS.	ANALYSIS + DESIGN PACKAGES, ADMIN. PACKAGES.
168	STRUCT. ANALYSIS	STRUCT. ANALYSIS.
173	ALL	PLANNING-CALC.-WORD PROC.
185		
91	STRUCTURAL ENG., TRAFFIC AND TRANSPORTATION, ADMINISTRATION.	FINANCIAL STATEMENTS, BALANCE SHEETS.
190	NONLINEAR FE PROGRAMS	NONLINEAR FE PROGRAMS
22	STATICS	
297	ENG. ANALYSIS.	WORD PROC.
203		CIV. ENG.
215	PROD. OF MATERIAL LISTS ETC.	STRUCT. DESIGN, BOOK KEEPING, WORD-PROC.
220		
227	ADMIN., STRUCT. ENG., GEOTECHNICAL ENG.	ADMIN., ENG., CONSTRUCT. MANAGEMENT.
232	NATIONAL ROAD NETWORK PROGRESS REPORTS ON NEW CONSTR.	1. SAS SYSTEM 2000 FOR COMPREHENSIVE NATIONAL ROAD NETWORK DATABASE. 2. ALADIN DATABASE.
239	ENG. & PROJECT MANAGEM.	ENG. & ACCOUNTING.
244	DESIGN AND ASSESSMENT OF STRUCT. COMPONENTS.	ICES, MOSS

Rec. no.	In house development	Commercial packages
57	STRUCTURAL ANALYSIS, ROAD DESIGN, HYDRAULICS, ENVIRONMENTAL PLANNING, TRAFFIC PLANNING, GEOTECHNIC, RESSOURCE AND FINANCIAL PLANNING.	STRUCTURAL ANALYSIS, STATISTICAL ANALYSIS, FINANCIAL PLANNING
256	HIGHWAY & BRIDGE DESIGN.	
261	SPECIALIZED ENG.	WORD PROC., GEN. ENG.
268	CIV., STRUCT., MECHANICAL, ELECTRICAL, CAD, INFORMATION MANAGEMENT.	ALL
273	STRUCT., CAE	FEM PROGS., CAD
285	STRUCT. CALC.	
92	PLANNING & STEERING/BUDGETTING	ADMINISTRATION, WORD PROCESSING
290	CAD	FEM, PERT, HIGHWAY, DESIGN.
23	STRUCTURAL ENGINEERING	
303	PRESTRESSING CALC.	STRUCT. ANALYSIS.
315	STRUCT. ANALYSIS (CONCRETE, REINFORCEMENT, PRESTRESSED CONCRETE).	FINITE ELEMENTS, CAD, NETWORK ANALYSIS (CPM).
320	FINITE ELEMENT SOFTWARE.	
327	BRIDGES STRUCTURES.	
58	STRUCTURAL ANALYSIS ADMIN.	STRUCTURAL ANALYSIS.
93	STRUCTURAL ENGINEERING	ALL OTHERS
24		
59	STRUCTURES, ROADS	DATA BASES
94		
25	PLATES AND SHELLS, STRUCTURAL ANALYSIS	PLATES AND SHELLS, STRUCTURAL ANALYSIS.
60	STATICS, PLANNING HYDRODYNAMICS	WORD PROCESSING.
95	FINITE ELEMENT METHOD	FINITE ELEMENT METHOD
26	LITTLE UP TO MEDIUM SIZE PROGRAMMES FOR CONSTRUCTION AND STATICAL COMPUTATIONS, USER ORIENTED	ADMINISTR., BUDGETTING, WORD PROCESSING, CAD, EXTENDED
196	ADMIN.	PROGR. FOR STATICAL COMPUT.
102	STRUCTURAL ENG.	
109	HIGHWAY ENG. & STRUCT.	HIGHWAY ENG. & STRUCT.
114	STRUCT. ENG. ANALYSIS.	GRAPHICS & STRUCT. ENG. ANALYSIS.
126	FEM STRUCT. ENG. ANALYSIS.	
131	SCIENTIFIC & TECHNOLOGICAL AREA	ADMINISTRATION AREA
138	FEM COMPUTER GRAPHICS, GEOMETRICAL MODELLING.	
143		
155	DESIGN-STRUCT. STEELWORK.	
61	CALCULATION, ADMINISTRATION.	ADMINISTRATION, PLANNING & STEERING, CALCULATION, WORD PROCESSING.
160	STRUCT. WORD PROC. ADMIN.	
167	STRUCT. ANALYSIS, CAD.	
172		WORD PROC., DATABASES.

Rec. no.	In house development	Commercial packages
179	TECHNICAL CALC.	FINITE ELEMENTS
184	STRUCT. ANALYSIS, FEM METHODS	CAD/CAE, FEM-PROGRAMS.
96	ADAPTION OF COMMERCIAL PACKAGES TO OWN NEED AND/OR SPECIFIC COMPUTER REQUIREMENTS.	PRESTRESSED CONCRETE BRIDGES - 'FRAP/TROS' FEM (PLATES, FOLDED STRUCTURES) - 'NE10', 'NE07', FEM (GEOM. & PHYSICALLY NON-LINEAR BEAM STRUCT.) 'STAR 2', SOIL MECHANICS 'SPUBOL'
27	FINITE ELEMENTS, BOUNDARY ELEMENTS	FINITE ELEMENTS
97	STRUCT. ENG., FINITE ELEMENTS, CAD	TEXTPROCESSING (WORDSTAR)
296	SCIENTIFIC	
202	ADMIN.	
209	TECHNICAL, ADMIN.	ADMIN.
214		
226		
231	STRUCT. CALC. & ADMIN.	STRUCT. CALC. REINFORCEMENT DETAILING.
238	TEMPORARY WORKS: FORMWORK: EARTH SUPPORT.	STRUCT. CONCRETE TO CP110, STEELWORK: STRUCT. ANALYSIS, STABILITY OF SLOPES.
243	STRUCT. & CIV. ENG. CALC. & ACCOUNTING.	STRUCT. & CIV. ENG. CALCS.
255		
62	TECHNICAL AND ECONOMICAL CALCULATIONS, ADMINISTRATION, CAD	WORD PROCESSING, DATABASES.
260	SMALL PROGS. FOR ENG. CALC.	ENG. CALC., SPREAD SHEET PRG., ACCOUNTING PROGS., WORD PROC. PROG., CAD PROG., INFORMATION RETRIEVAL PROG. STRUCT.
267	STRUCT., WORD PROC., INFORMATION.	
272		
279	STRUCT. ANALYSIS.	FINITE ELEMENT PROGRAMS.
284	ADMIN., CALC., INFO. RETRIEVAL, STATISTICAL ANALYSIS.	PROGRAMMING TOOLS.
28	PRODUCTION AND EVALUTION OF BIDS CONTRACT AWARD, ACCOUNTING FOR CONSTRUCTION WORK.	FEM, ROAD PLANNING
98		
302	STRUCT. (BRIDGE), GEOMETRY, HIGHWAY.	SPREADSHEETS, DB, WP.
309	CALC.	ADMIN.
314		
326	DESIGN OF STRUCTURES, JOB COSTING.	STRUCT. DESIGN AND HYDROLOGY
331	DATABASES, EXPERT SYSTEMS.	FEM ANALYSIS, PROJECT PLANNING.
63		

Rec. no.	In house development	Commercial packages
338	NON-LINEAR + LINEAR STRUCT. ANALYSIS ADMINISTRATION, DRAWING PROD.	WP/PROJECT MANAGEMENT/BUILDING SERVICES.
29	ENGINEERING (STATIC)	
99	CALCULATION, ADMINISTRATION	WORD PROCESSING, PLANNING, BUDGETTING
64		
30	STATIC OF FRAMES, FINITE ELEMENTS	
65	DESIGN PROGRAMS FOR SANDWICH-STRUCTURES ELASTO-PLASTIC COLUMN AND FRAME DESIGN OF HOLLOW CORE SLABS, FEM MODELS OF R.C. AND P.C. STRUCTURES, FIRE RESISTANCE OF CONCRETE STRUCTURES	STATISTICS, SIMULATION, GRAPHICS, LINEAR AND NON-LINEAR STRUCTURAL ANALYSIS (ADINA, PAPEC, ETC). CONSTRUCTION PROJECT PLANNING AND CONTROL P.C.-PROGRAMS
31	CAD, FINITE ELEMENTS	CAD, FINITE ELEMENTS
195	STRUCT. ENG., DESIGN OF REINFORCED AND PRESTRESSED CONCRETE BEAMS.	ADMIN., CALC., WORD PROC. PROD. OF DRAWINGS., TENDER DOCUMENTS.
101	COMPUTATIONAL MECHANICS, STRUCTURAL ANALYSIS.	WORD PROCESSING
108	ENG. ANALYSIS, IE, FINITE ELEMENT ANALYSIS, GRAPHICS, COMMERCIAL APPLICATIONS, CAI PACKAGES.	CAD/CAM, DATABASE, AGL, FINITE ELEMENTS ANALYSIS.
113	STRUCT. ENG., PROJECT CO-ORDINATION.	PAYROLL, INVENTORY, FINANCIAL ACCOUNTING.
125	STRUCT. ENG.	
130	STRUCT. ELEMENTS VERIFICATION	FINITE ELEMENT ANALYSIS.
137		
142	ALL OF 5 EXCLUSIVE WORD PROCESSING, DRAWINGS, BUDGETTING	DRAWING, WORD-PROCESSING, BUDGETTING.
149	STRUCT. ENG.	ICES-STRU DL
66		
166	STRUCT., ROADS, BUDGETTING.	CAD, ROADS, STRUCT, WORD PROC.
171	STRUCT. AND BRIDGES.	
178	RESEARCH	CALC., WORD PROC.
183	CALC. AND SO ON	FEM
32	FINITE ELEMENT PROGRAM	LOTUS 1-2-3
295		
201	CALC.	ALL
208	SEE F5.	ADMIN., CALC., WORD PROC., PROD. OF DRAWINGS.
213		
225	STRUCT. ENG. (FEM MAINLY).	
230	MAINLY FINITE ELEMENTS + HYDRODYNAMICS CODES.	HIGHWAY DESIGN, PROJECT MANAGEMENT, BUILDING DESIGN.
237	STRUCT. GEOMETRY OF BRIDGES DECKS.	STRUCT. FINITE ELEMENT.
242	HARBOUR & GEN. CIV. ENG. & STANDARD.	WORD PROC., STRUCT. & SLIP
	METHOD OF MEASUREMENT (CESSM)	CIRCLE ANALYSIS. SPREADSHEET ANALYSIS.



Rec. no.	In house development	Commercial packages
249	CAD, TRANSPORT PLANNING, ENG. ANALYSIS & DESIGN.	GROUNDMODELLING, VARIOUS ENG. PROGRAMS E.G. LUSAS (FINITE ELEMETS). MANAGEMENT
254	CALC. (ENG. ANALYSIS)	WORD PROCESSING, BUDGET.
67	CALCULATION, PRODUCTION OF DRAWINGS.	ADMINISTRATION, PROJECT STEERING, WORD PROCESSING.
266	DETAIL ANALYSIS & CALCS.	CAD-SYSTEM, BASIC FRAME CALC
271	BUDGETTING	ADMIN., STRUCT. ANALYSIS.
278	STRUCT. DESIGN ANALYSIS.	STRUCT. DESIGN ANALYSIS, CAD
283	STRUCT.ENG.	
33		
301	BILLING	TECHNICAL, WORD PROC.
308	STRUCT. DESIGN, ROAD & HWDESIGN.	STRUCT.DESIGN, ICES STRUDL, STRESS, SAP, DRAIN, SDZA, SD 2B, TABX.
313		PLANNING, CALC.
325	STRUCT. ENG.	STRUCT. ENG.
68	CALCULATION	ADMINISTRATION, WORD PROCES- SING, CAD-SYSTEM.
337	STRUCT. DYNAMICS (FREQUENCY RESPONSE), STABILITY OF SHELLS (FINITE ELEMENTS)	STRUCT. ANALYSIS (ADINA, SAP ETC.)
34		
69	CALCULATION-, PLOTTER- PROGRAMMES.	ADMINISTRATION, WORD PROCES- SING, CALC.

Appendix VIII. Area for specialized Symposia

Rec. no.	Area	Rec. no.	Area
194	CAD/CAM FOR STRUCT. STEEL WORKS.	228	CAD/CAE
100	CAD	257	ANALYSIS, POST-TENSIONING, FINITE ELEMENTS.
153	CAD	274	DATA MODELLING IN STRUCT. ENG., DATA MODELLING IN GEN.
219	INTEGRATED COMPUTER AIDED PLANNING (ARCH-LUG-SPECIALISTS).	304	STRUCT. ENG., BRIDGE ENG.
307	NUMERICAL METHODS IN STRUCT. MECHANICS.	328	BRIDGE DESIGN, STRUCTURES, HYDRAULICS, HIGHWAY.
38	DEVELOPING INTEGRATED CAD SOFTWARE FOR CIVIL ENGINEERING (DESIGN, CALCULATION, PLANNING, PRODUCTION OF DRAWINGS, MANAGEMENT.)	333	CAD
39	BRIDGES-MAINTENANCE	54	STRUCTURAL ENG., CONSTR. MANAGEMENT
111	COPUTER AIDED ANALYSIS, DESIGN & DRAFTING	55	SOFTWARE ON CAD OR COMPUTATION FOR ARCHITECTURES AND STRUCTURES
118		103	CAD
123		120	
140	OFFSHORE ENG. STRUCT.	168	
159	STRUCT. ANALYSIS, REINFORCED CONCRETE DESIGN.	190	MAN-COMPUTER INTERACTIVITY IN NONLINEAR COMPUTATIONS.
164	PC BRIDGES.	232	ROAD DESIGN, CONSTR. AND MANAGEMENT SYSTEMS
7		256	OPTIMAZATION IN BRIDGE DESIGN.
235	DEV. IN DATABASES AND EXPERT SYSTEMS IN STRUCT. ENG.	273	MATERIAL MODELLING, TIME DEP. EFFECTS, SOILS, CONCRETE
240	INFORMATION RETRIEVAL.		COMPUTERIZED BRIDGE RATING.
264	FEM, ES IN STRUCT. ENG.	285	STRUCT.
276	KNOWLEDGE BASED AND EXPERT SYSTEMS.	303	
43	STRUCTURAL DESIGN	315	CAD FOR BRIDGE AND STRUCT. ENG.
129	SOIL STRUCT. INTERACTION	327	STRUCTURES, BRIDGES.
146	REINF. AND PRESTRESSED CONCV STRUCT. MECHANICS, NONLINEAR ANALYSIS, FINITE ELEM. APPLICATIONS	93	STRUCT. ENG.
205	CALC. + CAD	25	STRUCTURAL ANALYSIS, FEM UNDERGROUND STRUCTURES AND LARGE SPAN STRUCTURES.
217	EUROPE.	126	STRUCT. ANSLYSIS FEM.
275	KNOWLEDGE BASED AND EXPERT SYSTEMS.	155	STRUCT. STEEL DESIGN, & DETAILING
329	STRUCTURES, NONLINEAR ANALYSES.	167	
48	STRUCT. & BRIDGE ENG., MUNICIPAL (LAND DEV.)	97	GEOMETRIC MODELLING, ACCURACY OF FINITE ELEMENTS, WORKSTATION CONCEPTS.
49		30	CAD-CAM, USE OF PC-XT OR SIMILAR
15	STRUCTURAL ENGINEERING PROJECT MANAGEMENT	65	
128	CAD	125	STRUCT. ENG.
174		142	OFFICE-AUTOMATION, CAD/CAE, EXPERT-SYSTEMS, FILING SYST.
86	PROD. OF DRAWINGS.	171	
186	COORDINATION, CALCULATION PROGRAM-CAD-	237	COMPUTER AIDED DRAFTING USING MICROS. STRUCT. ERRORS DUE TO THE USE OF COMPUTERS, & HOW TO PROTECT AGAINST THEM.
		308	CAD A.I. & EXPERT SYSTEMS.
		337	DYNAMICS, STABILITY NONLINEAR MATERIALS, NUMERICAL METHODS.

Appendix IX. Congress Themes for structural CAE

Rec. no.	Congress Themes for structural CAE	Rec. no.	Congress Themes for structural CAE
119		297	
71		57	
219		92	ALL TOPICS.
37		320	
307	NUMERICAL METHODS	109	
73		155	ANYTHING RELATING TO THE DESIGN OF DETAILING OF STRUCT. STEEL.
39	BRIDGES-DESIGN WITH CAE		E.G. IN HELSINKI.
123		184	GEOMETRIC MODELLING, EDP-CONCEPTS : WORKSTATION
140		97	LOCAL AR-NETW./PUBL.NETWORKS
176			
7		314	BENEFITS OF CA DRAWING & DESIGN SOFTWARE + PITFALLS
235	DEV. IN DATA BASES, EXPERT SYSTEMS, AND OTHER DESIGN AIDS.	338	CAD-CAM
240		30	COMPUTER AIDED STRUCT. ENG. (CAD/CAM)
264	BRIDGES, FEM IDEALIZATION. HOW DO WE STAY ON TOP OF CAE RATHER THAN THE REVERSE	65	USER-INTERFACE AND INTEGRATED USE OF AUTOMATED STRUCT. FUNCTIONS.
8		142	
151		171	
163	INTERACTIVE COMPUTER AIDED STRUCT. DESIGN.	201	
	CALC. + CAD	208	
205		237	THE TRAINING OF ENG. FOR USE OF CAE.
210		308	
263		68	
13		337	
310			
48	BRIDGE DESIGN		
49			
16			
116			
121	INFLUENCE OF CAE ON THE RELIABILITY OF THE DESIGN PROCESS.		
150			
174			
191	IMPACT ON EDUCATION AND PRODUCTIVITY.		
291			
228			
245			
274			
333			
53			
19	COMPUTER CHAIN : CAE CAD CAM		
54			
55			
120			
161			
168	STRUCT. ANALYSIS		
91			
190	RESULT VERIFICATION CAE DESIGN PROCESS.		



Appendix X. Other information wanted

Rec. no.	Other information wanted	Rec. no.	Other information wanted
112	WE WOULD LIKE TO INITIATE COMPUTER USE IN ORGANISATION BUT AWAIT FUNDS ACUMULATION FOR SAME	245	DATA BASES & THEIR HANDLING & HOW THEY SHOULD BE FUNDED. -PARTICULARY "STRUCT. FAILURES" & "GEOTECHNICAL"
36	USAGE OF PC ON CONSTRUCTION SITES	55	ADVERTISES ON COMPUTER AND SOFTWARE.
148	WE ARE INTERESTED TO HAVE DETAILS OF NONLINEAR ANALYSIS PROGRAMMS PARTICULARLY IN CABLE STAYED BRIDGES.	244	VERIFICATION OF COMMERCIALY DEVELOPED PROGRAMS.
39	COLLECTED LISTS OF THE DATA-BASES (UNIVERSITIES, LIBRARIES ABOUT STRUCTURAL (BRIDGES) CALCULATION	23	REPORTS ABOUT NEW HARD AND SOFTWARE IN THE TECHNICAL FIELD
135	SUPER-MICRO SYSTEM OF 32 BIT MPU OR EWS (LIKE APOLLO DOMAIN SYSTEM) IS UPDATED IN JAPAN. THE COMPUTER SYSTEM WILL BE CHANGED IN THE NEAR FUTURE INSTEAD OF DUMB TERMINAL & MAIN FRAME SYSTEM	138	MANAGEMENT OF SOFTWARE MAKING. MANAGEMENT OF DATABASE CREATION. STANDARDIZATION RELATED INFORMATICS.
206	TREND ON USAGE OF COMPUTERS IN GENERAL IN THE FIELD OF CONSLT ENG.	184	EXCHANGE OF INFORMATION AND EXPERIENCE CONCERNING USE OF COMMERCIAL CAE-PROG. PACKAGES LIKE FEM-PACKAGES. PRE- AND POSTPROCESSORS ETC.
9	A) INFLUENCE THE OTHER COMMISSIONS/WORKING GROUPS ETC TO WRITE THEIR RECON/MODEL CODES ETC IN A WAY ADAPTED TO COMPUTER PROGRAMMING.	231	FINANCE, COST EFFECTIVINESS, LIABILITY OF SOFTWARE PRODUCERS, MAINTENANCE OF SOFTWARE.
	B) PUBLISH BASIC ANALYSIS/CALCULATIONS ALGORITHM/ PROCEDURES.	284	STANDARDS, TECHNICAL REGULATIONS AND CERTIFICATION.
	C) ESTABLISH TEST PROCEDURES FOR APPROVAL OF PROGRAMS.	65	THE INFORMATION CONCERNS THE ACTIVITY AT THE DIVISION OF BUILDING TEHNOLOGY AND COMMUNITY DEV./TECHNICAL RESEARCH CENTRE OF FINLAND.
105	DIRECTORY OF PROGRAMS ABOUT STRUCT. SURVEYING & ROAD/ RAIL ROAD DESIGN AVAILABLE FOR THE IBM PC SERIES.	337	
110	VARIOUS APPLICATIONS OF MINI COMPUTERS IN STRUCT. ENG. - FROM ANALYSIS, DESIGN THROUGH EXECUTION SPECIAL INTEREST - BRIDGE APPLICATIONS - AS PREVALENT IN OTHER MEMBER COUNTRIES OF IABSE.		
280	APPLICATION OF CAD PROGRAMMS IN CIV.ENG.		
128	WE NEED DEV. OF CAD SYSTEMS.		
291	SYSTEMS FOR CONTROL, INSPECTION OF STRUCT. INTEGRITY. COMP. APPLICATIONS FOR MEASURING VARIOUS STRUCT. PROPERTIES.		

Leere Seite
Blank page
Page vide