R E P O R T R E S U M E S

ED 016 479 JC 670 992

PROSPECTS OF ENGINEERING GRADUATES 1967.

BY- ALDEN, JOHN

ENGINEERING MANPOWER COMMISSION, NEW YORK, N.Y.

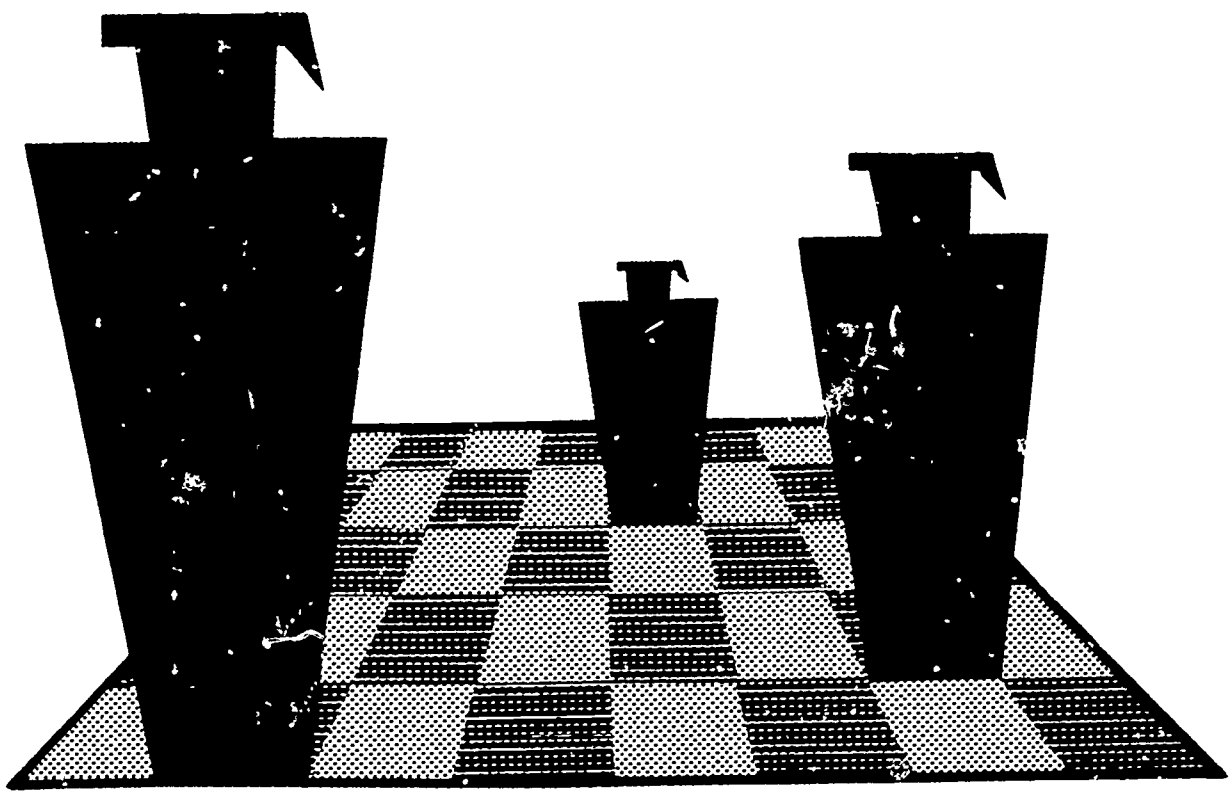
PUB DATE OCT 67

EDRS PRICE MF-$0.25 HC-$1.56 37P.

DESCRIPTORS- *JUNIOR COLLEGES, *ENGINEERS, *ENGINEERING TECHNICIANS, *EMPLOYMENT OPPORTUNITIES, *GRADUATE SURVEYS, SALARIES, OCCUPATIONAL SURVEYS, TECHNICAL OCCUPATIONS,

TO KEEP UP-TO-DATE ON TRENDS IN JOBS FOR ENGINEERING AND TECHNOLOGY GRADUATES, THE COMMISSION HAS TAKEN SURVEYS OF JUNE GRADUATING CLASSES SINCE 1957, EXCEPT FOR 1962-63. THIS 1967 SURVEY OF 229 ENGINEERING SCHOOLS AND 85 OTHER TECHNICAL SCHOOLS PROVIDES DATA ON KINDS OF INSTITUTIONS, CURRICULUMS, POSTGRADUATE ACTIVITY, STARTING SALARIES, ENROLLMENT TRENDS, AND KINDS OF DEGREES. THE DEMAND FOR NEW GRADUATES REMAINED HIGH, WITH 98 PERCENT IMMEDIATELY COMMITTED TO JOBS, GRADUATE STUDY, OR OTHER ACTIVITY, AND THE OTHERS CONSIDERING JOB OFFERS. THE NUMBER GOING DIRECTLY INTO GRADUATE STUDY APPEARED TO HAVE STABILIZED AT ABOUT 25 PERCENT AFTER SEVERAL YEARS OF RAPID INCREASE. MILITARY SERVICE TOOK 9 PERCENT OF THE CIVILIAN GRADUATES AS WELL AS THE 517 ENGINEERING GRADUATES OF ARMED FORCES SCHOOLS. THE NON-ACCREDITED INSTITUTIONS (WITH ONLY 7 PERCENT OF ALL ENGINEERING GRADUATES) HAD ONLY 12-13 PERCENT ENTERING GRADUATE STUDY, THE REMAINDER GOING DIRECTLY INTO JOBS. TECHNOLOGY GRADUATE ACTIVITIES ARE REPORTED SEPARATELY BY 2-YEAR ASSOCIATE AND 4-YEAR BACHELOR OF CHEMICAL AND $724 IN AERONAUTICAL ENGINEERING TO A LOW OF $614 IN NON-TECHNICAL JOBS. OTHER DATA ARE SUMMARIZED AND COMPARED. COPIES OF THE QUESTIONNAIRES ARE INCLUDED. THIS DOCUMENT IS ALSO AVAILABLE FOR $1.50 FROM ENGINEERING MANPOWER COMMISSION OF ENGINEERS JOINT COUNCIL, 345 EAST 47TH STREET, NEW YORK, N.Y. 10017. (HH)

Prospects of Engineering Graduates 1967



a survey conducted by the

ENGINEERING MANPOWER COMMISSION

OF ENGINEERS JOINT COUNCIL

P R O S P E C T S

O F

E N G I N E E R I N G

G R A D U A T E S

1 9 6 7

ENGINFERING MANPOWER COMMISSION
of Engineers Joint Council
345 E. 47th Street
New York, N. Y. 10017

October, 1967

$1.50

The Engineering Manpower Commission of Engineers Joint Council is charged with the responsibility of developing programs to:

1. Aid in establishing the importance of engineering to the national economy.

2. Aid in maintaining an adequate supply of engineers.

3. Promote the most effective utilization of engineers in support of the national health, safety, and interest.

The Commission consists of representatives from the following engineering societies:

American Society of Civil Engineers
American Institute of Mining, Metallurgical, and Petroleum Engineers
The American Society of Mechanical Engineers
American Water Works Association
Institute of Electrical and Electronics Engineers
The American Society for Engineering Education
American Society of Heating, Refrigerating, and Air-Conditioning Engineers
American Society of Agricultural Engineers
American Institute of Chemical Engineers
Society of Fire Protection Engineers
Society for Nondestructive Testing
The Society of American Military Engineers
The American Institute of Industrial Engineers
American Institute of Consulting Engineers
American Institute of Plant Engineers
American Association of Cost Engineers
American Society for Metals
Instrument Society of America
American Society for Quality Control
National Institute of Ceramic Engineers
Society of Women Engineers

Contents

EMC OFFICERS AND STAFF

Chairman.....Clifford H. Doolittle

Vice-Chairman and
Chairman of Surveys Committee.....Donald E. Irwin

Executive Secretary.....John D. Alden

Military and Legislative Advisor.....C. S. Dargusch

This study was prepared under the general direction of John Alden. Typing was done by Anne Howell. Carol Iceland assisted in recording and compiling data, as well as in conducting the survey.

INTRODUCTION

Since 1958 the Engineering Manpower Commission has conducted surveys of the June graduating class to evaluate trends in the placement and occupation of new engineering graduates. This is the fourth in the current series of annual surveys which started in 1964 after a lapse of two years.

Deans and placement officers of 229 engineering schools and 85 other technological institutions replied to this year's survey. The information reported has been analyzed according to various categories of institution, curriculum, and post-graduate activity.

This year new statistics have been added on graduates in engineering and industrial technology at both the bachelor's and associate levels. The growing importance of the technology programs makes a comparison of these students with engineering graduates particularly interesting.

A section on starting salaries is included because of its interest to users of this report. Similarly, a section on enrollment and degree trends for the past and future is included to add to the perspective of the report.

In computing statistics on the placement of the 1967 graduating class, those graduates about whom no information was known have been excluded from the figures and percentages. They are covered separately in the analysis of non-respondents. Also omitted from the general tables are the returns from five armed forces schools, three maritime academies, and two industry-sponsored institutions, since none of these can be considered typical of the civilian engineering and technical schools. These special schools are covered by separate tables or footnotes as appropriate.

In past years it has been difficult to categorize properly a special group of students who have been employed but are entering full-time grad-

uate study under the sponsorship of their employer. This year such individuals, where not reported separately, have been counted in both the employed and the graduate study categories, as they obviously qualify for both. However, this group has been counted only once in the totals. Care should be used when taking figures from the tables to avoid "double counting" of this category.

Previous reports have included comparisons of engineers with students in the physical sciences and non-technical fields, even though it was recognized that data for these groups were not being obtained from a truly suitable sample of institutions offering such programs. This year the data obtained for the non-engineering groups were so sketchy that it was decided to drop them from the report and limit comparison to the technology graduate groups mentioned above.

This survey of the annual engineering and technology graduating classes is proving increasingly useful as a means of identifying trends in educational and occupational patterns as well as providing an indication of the placement prospects of new graduates.

SUMMARY AND CONCLUSIONS

This survey indicates that the demand for new engineering graduates remains high, as indicated by the small number of students reported as having no employment offers or other plans. The proportion of graduates having definite commitments is the highest ever reported -- 98% -- with most of the remaining 2% still considering offers of employment at the time the survey was taken.

The sustained favorable employment climate bears out the findings of EMC's last demand survey[1/] and is in line with other indices of manpower demand which show a very high level of recruiting activity for 1967 and a large number of unfilled job openings for engineers.

The percentage of engineering graduates going directly on to advanced degree studies has apparently stabilized at about 25% after several years of rapid increase. The 1967 figure of 24.9% is almost identical with that reported in 1965 and a bit lower than 1966, although not significantly so.

Military service is now claiming 9% of the new civilian engineering graduates, to which must be added 517 graduates of armed forces schools who received engineering degrees. The civilian graduates in this category were about equally divided between ROTC programs and other forms of military service. Although the military percentage is higher than reported last year it is not greatly different from recent years, when it has fluctuated between 7% and 11%.

In comparison with ECPD-accredited schools, the non-accredited institutions, with only about 7% of all engineering graduates, differed mainly in

1/ Demand for Engineers and Technicians - 1966. Engineering Manpower Commission of Engineers Joint Council, 345 East 47th Street, New York, New York 10017 - $4.00 prepaid.

having only about half the percentage entering graduate studies and a correspondingly greater percentage accepting employment.

Differences between the various engineering curricula were minor except in the categories of those employed, which ranged from a low of 30% to a high of 83%, and those entering graduate study, which varied between 10% and 56%. Detailed results will be found elsewhere in this report.

The results for technology graduates are reported separately by two-year associate degree programs and four-year bachelor of technology programs. The two-year graduates are further broken down by curriculum and by ECPD-accreditation status. None of the four-year programs are currently accredited by ECPD, although a number are given by schools having other curricula on the ECPD lists. These are separately tabulated in the detailed figures.

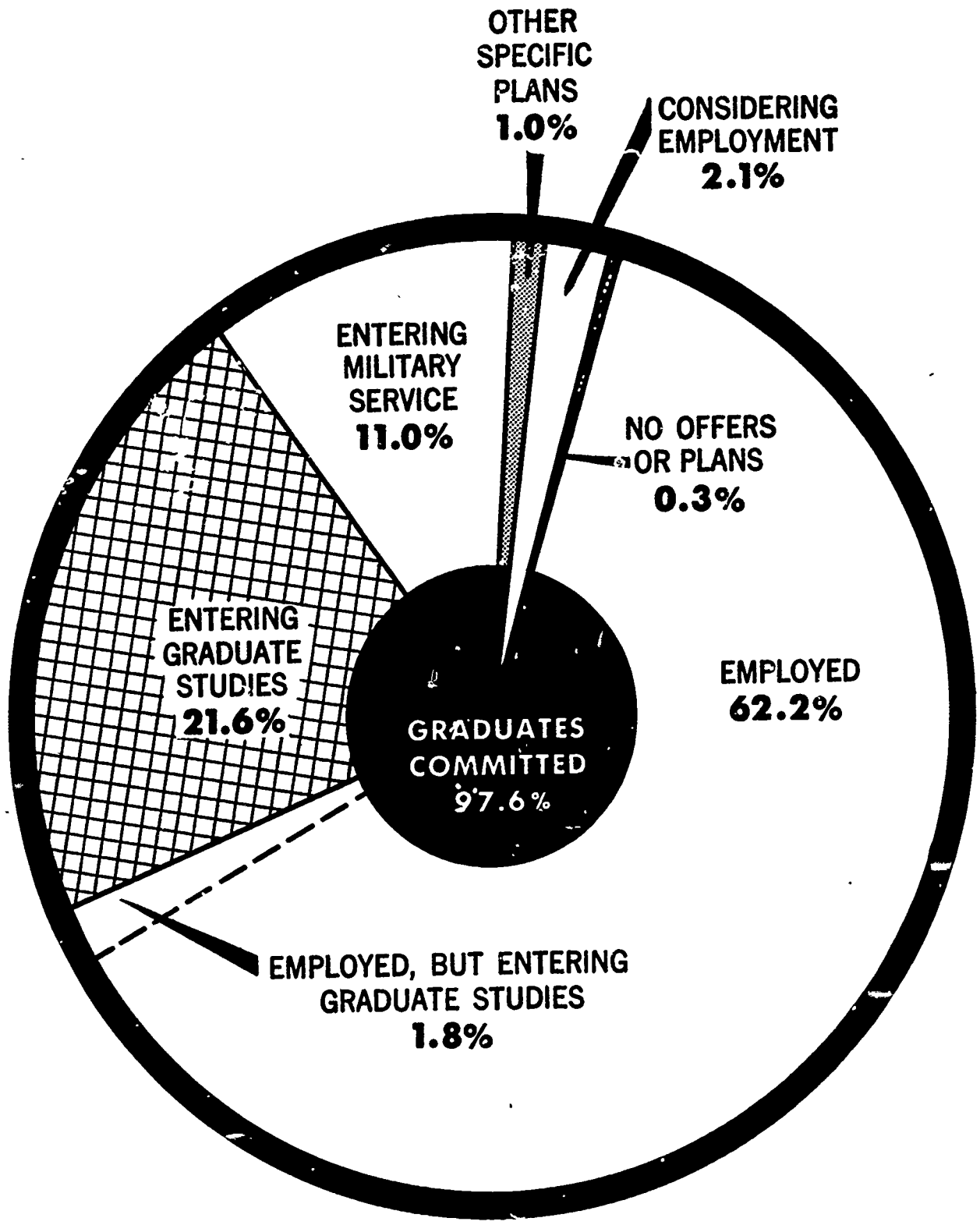
Despite the excellent response to this survey, it is estimated that no placement information is known for about 20% of this year's engineering graduates. This situation has existed in past years and shows few signs of improving. Detailed and complete statistics from many schools are proof that placement information can be obtained, and because of EMC's belief that such data are useful to the engineering community, it is hoped that this report will stimulate even more of our schools to compile them.

It may be of interest to note that at least one school which reports complete information every year requires the completion and filing of a personal record form as a prerequisite for graduation. Their form is especially designed to obtain the data for the EMC survey as well as other information desired by the school.[1/]

1/ For further information write to Professor J. A. Marks, Engineering Placement Director, College of Engineering, The University of Wisconsin, Madison, Wisconsin 53706.

Placement Status of

Engineering Graduates - 1967



SPECIFIC SURVEY RESULTS

ECPD ACCREDITED SCHOOLS VERSUS NON-ACCREDITED SCHOOLS

The following five categories constitute the "graduates committed" group, i.e., those who have specific commitments for their occupation after graduation: employed, employed and entering graduate studies, not employed but going on to full-time graduate studies, entering military service (ROTC and other), and other specific plans. This grouping is used throughout the report as an indicator of the extent to which graduates have committed themselves to a definite plan. Note that the survey covers only baccalaureate

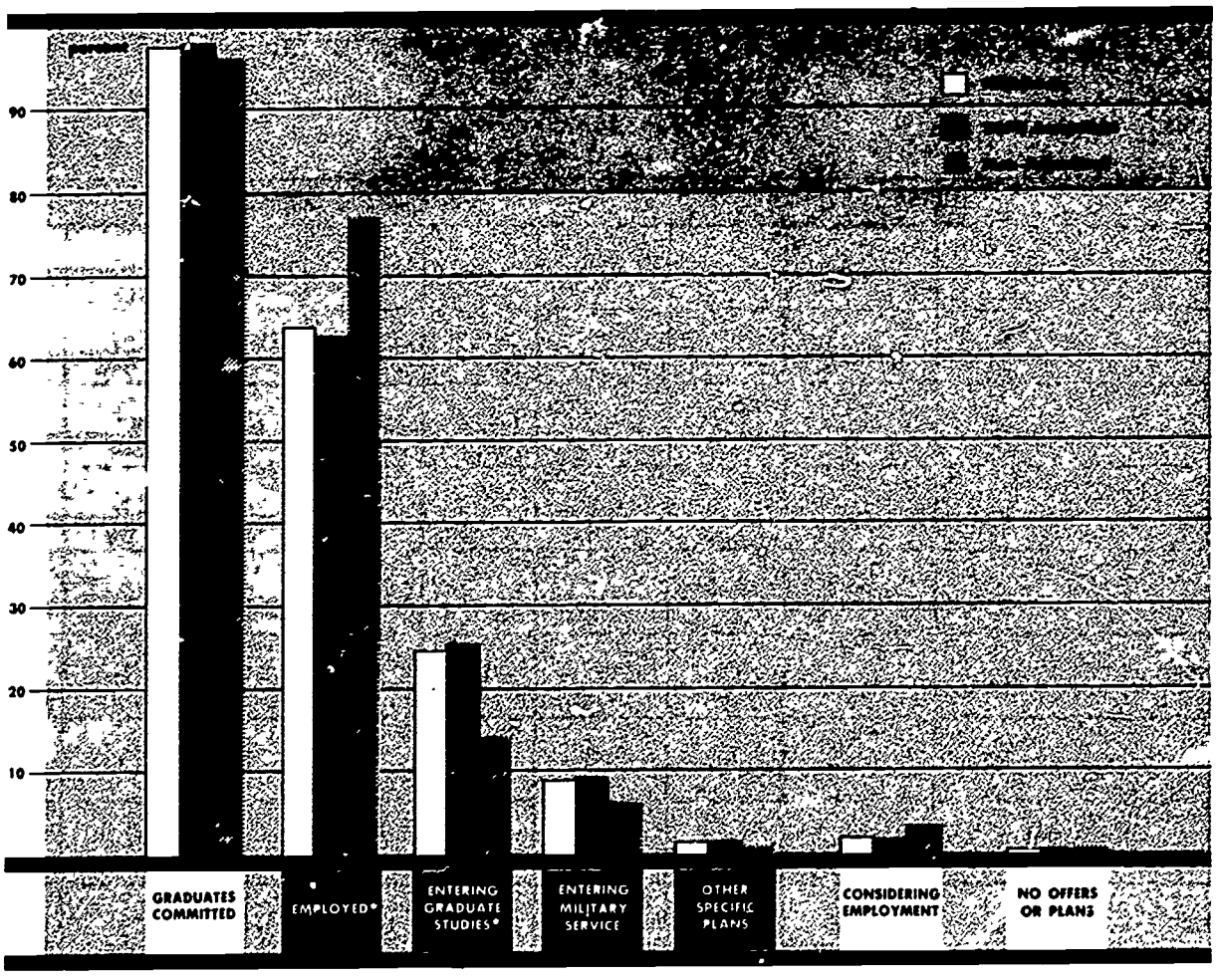
Placement Status of Engineering Graduates
ECPD Accredited and Non-Accredited Schools -- 1967

PLACEMENT STATUS	ALL SCHOOLS		ECPD ACCREDITED SCHOOLS		NON-ACCREDITED SCHOOLS	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
EMPLOYED	13779	62.3	12607	61.4	1172	75.0
EMPLOYED AND ENTERING FULL-TIME GRADUATE STUDY	327	1.5	283	1.4	44	2.8
ENTERING GRADUATE STUDY	5158	23.4	4981	24.3	177	11.3
ENTERING MILITARY (ROTC)	1005	4.6	937	4.6	68	4.3
OTHER MILITARY SERVICE	961	4.4	930	4.5	31	2.0
OTHER SPECIFIC PLANS	325	1.5	310	1.5	15	1.0
GRADUATES COMMITTED (Total of above)	21555	97.7	20048	97.8	1507	96.3
CONSIDERING JOB OFFERS	463	2.1	409	2.0	54	3.4
NO OFFERS OR PLANS	51	0.2	47	0.2	4	0.3
TOTAL WITH STATUS KNOWN	22069	100.0	20504	100.0	1565	100.0
NO INFORMATION	2937	--	2642	--	295	--
TOTAL DEGREES AWARDED	25006	--	23146	--	1860	--

graduates, not those receiving master's or doctor's degrees.

This year the ECPD-accredited and non-accredited groups show closely similar levels with respect to graduates committed, but there are significant differences in the categories making up the totals. Most striking are the percent employed (60% for ECPD schools and 75% for non-accredited schools), and the percent entering graduate studies (24% for ECPD schools and 11% for the non-accredited group). The difference in the military service category (9% versus 6%) is about the same as last year. Differences in other categories appear to be insignificant.

Placement Status of Engineering Graduates
ECPD Accredited and Non-Accredited Schools -- 1967



* Those employed and entering graduate studies sponsored by employer are included in both categories.

COMPARISONS BY ENGINEERING CURRICULA

In comparing individual curricula, care must be taken to note the actual numbers involved. Although percentages smaller than 1% have been omitted from the following table for individual curricula, all figures based on small numbers should be interpreted with caution.

All curricula show extremely high percentages of graduates committed to specific plans, but there are significant variations in the employed and graduate study activities. Those most employment oriented are the petroleum, mechanical, electrical/electronic, and industrial engineers, with naval architecture by far the lowest. Graduate study is most popular with naval architecture, engineering science, and nuclear engineering graduates. There is no apparent explanation for the differences in the military service category.

Placement Status by Engineering Curricula - 1967

PLACEMENT STATUS		ENGINEERING CURRICULUM								
		AERO.	AGR.	ARCH.	CERAM.	CHEM.	CIVIL	ELEC. & ELEX.	ENG. GEN.	SCI. PHYS./MECH.
EMPLOYED**	No.	458	119	192	63	1150	2045	4137	416	275
	%	54%	60%	59%	52%	60%	64%	67%	63%	42%
ENTERING FULL-TIME GRADUATE STUDY**	No.	242	54	50	46	637	701	1468	175	336
	%	29%	27%	15%	38%	33%	22%	24%	27%	51%
ENTERING MILITARY SERVICE	No.	112	20	51	10	103	343	500	56	41
	%	13%	10%	16%	8%	5%	11%	8%	8%	6%
OTHER SPECIFIC PLANS	No.	12	4	12	0	10	58	110	7	8
	%	1%	2%	4%	0%	*	2%	2%	1%	1%
GRADUATES COMMITTED (TOTAL OF ABOVE)	No.	818	196	305	117	1883	3131	6061	649	637
	%	92%	98%	93%	96%	98%	98%	98%	98%	98%
CONSIDERING JOB OFFERS	No.	28	5	22	5	31	57	133	9	7
	%	3%	2%	7%	4%	2%	2%	2%	1%	1%
NO OFFERS OR PLANS	No.	0	0	0	0	4	12	9	2	0
	%	0%	0%	0%	0%	*	*	*	*	0%
TOTAL WITH STATUS KNOWN	No.	846	201	327	122	1918	3200	6203	660	654
	%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NO INFORMATION	No.	131	15	88	10	206	411	807	37	90
TOTAL DEGREES AWARDED	No.	977	216	415	132	2124	3611	7010	697	744

* Less than 1%

** Those employed and entering graduate studies sponsored by employer are included in both categories. Totals are therefore less than the sum of separate categories.

Note: Percentages are based on total with status known and may not add to 100 because of rounding.

The naval architecture, nuclear, petroleum, and ceramic groups in particular are so small that it is questionable whether they can continue to be reported individually in future surveys.

The architectural engineering category probably includes a number of students in architecture. While these should be discounted in a report of numbers of graduates, they are so closely related to their engineering counterparts that they do not distort the placement findings appreciably.

The "other specific plans" category includes several written in as Peace Corps but otherwise cannot be specifically identified. Most of the "no offers or plans" group probably consists of foreign students whose visas are expiring, as this reason was noted on several returns.

Placement Status by Engineering Curricula - 1967

ENGINEERING CURRICULUM									PLACEMENT STATUS
INDUS.	MECH.	METAL.	MIN.	NAV. ARCH.	NUC.	PETRO.	ALL OTHERS	TOTAL	
963 67%	3069 69%	309 62%	99 59%	8 30%	31 46%	59 83%	148 58%	14106 64%	No. % EMPLOYED**
267 19%	925 21%	149 30%	40 24%	15 56%	30 44%	7 10%	45 18%	5485 25%	No. % ENTERING FULL-TIME GRADUATE STUDY**
154 11%	374 8%	32 6%	23 14%	3 11%	5 7%	3 4%	55 22%	1966 9%	No. % ENTERING MILITARY SERVICE
40 3%	48 1%	8 2%	1 *	0 0%	0 0%	2 3%	2 *	325 1%	No. % OTHER SPECIFIC PLANS
1411 98%	4352 98%	492 99%	163 97%	26 96%	65 96%	71 100%	247 97%	21555 98%	No. % GRADUATES COMMITTED (TOTAL OF ABOVE)
22 2%	98 3%	3 1%	2 1%	1 4%	3 4%	0 0%	7 3%	463 2%	No. % CONSIDERING JOB OFFERS
7 *	12 *	0 0%	3 2%	0 0%	0 0%	0 0%	1 *	51 *	No. % NO OFFERS OR PLANS
1440 100%	4462 100%	495 100%	168 100%	27 100%	68 100%	71 100%	255 100%	22069 100%	No. % TOTAL WITH STATUS KNOWN
185	556	59	35	11	12	12	81	2937	No. NO INFORMATION
1625	5018	554	203	38	80	83	336	25006	No. TOTAL DEGREES AWARDED

* Less than 1%

** Those employed and entering graduate studies sponsored by employer are included in both categories. Totals are therefore less than the sum of separate categories.

Note: Percentages are based on total with status known and may not add to 100 because of rounding.

COMPARISONS WITH PREVIOUS SURVEYS

After annual surveys from 1958 through 1961, surveys were suspended for two years because it appeared that the placement situation was unchanged. In 1964, the survey was re-instituted because of the obviously reduced hiring activity for experienced engineers. No particular difficulties in finding suitable employment are evident from the current survey. It is of interest that the percentage of graduates committed, which had declined steadily for several years, is now the highest ever reported in these surveys.

The number entering full-time graduate studies sponsored by their employer has declined from 2.9% last year to 1.5% this year. This figure may

Placement Status of Engineering Graduates
1967 Compared with Previous Years

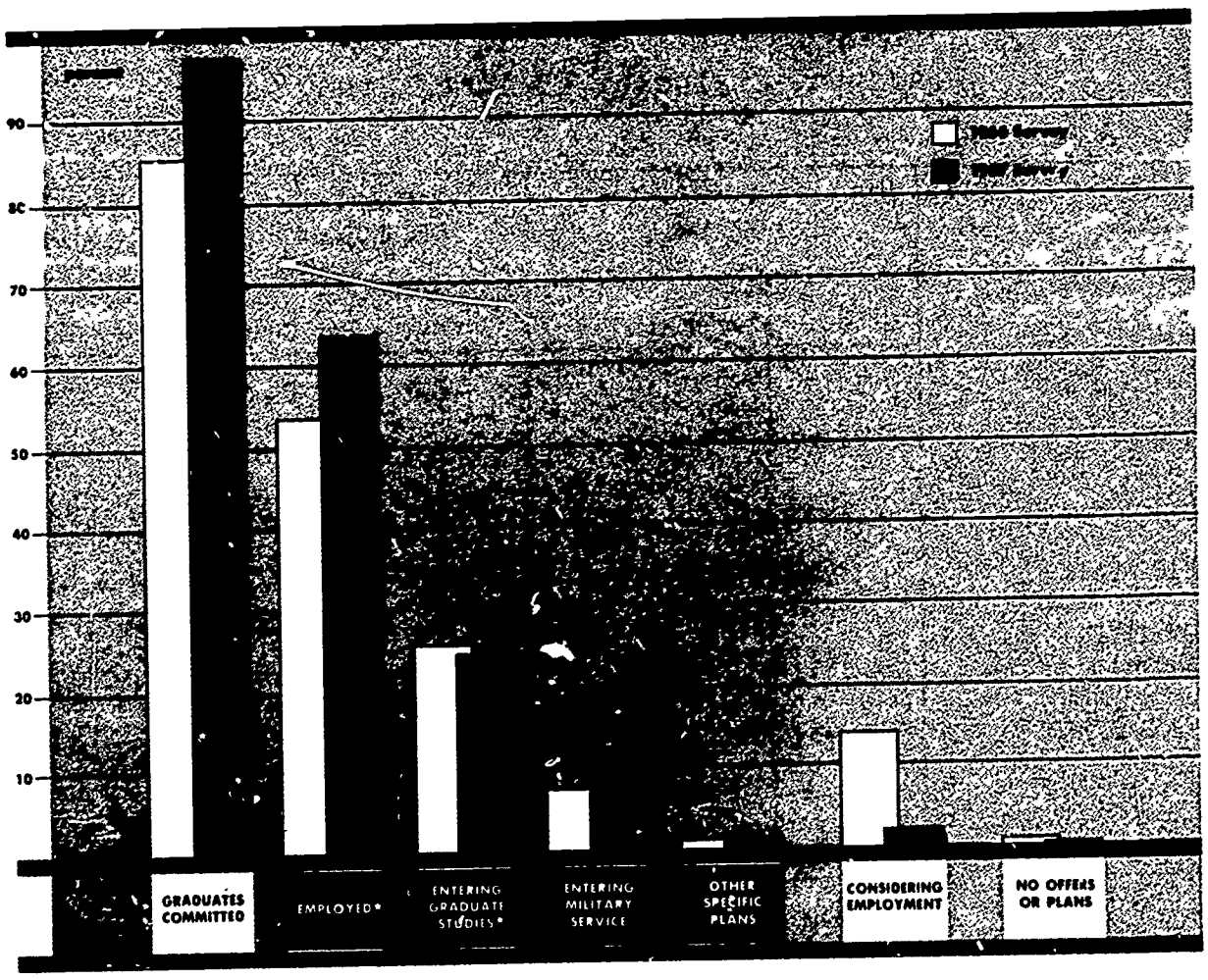
PLACEMENT STATUS	1961 Survey		1965 Survey		1966 Survey		1967 Survey	
	No.	%	No.	%	No.	%	No.	%
EMPLOYED*	10625	65.0	11496	59.7	11439	53.9	14106	63.8
ENTERING GRADUATE STUDIES*	2331	14.3	4936	24.8	5432	25.5	5485	24.9
ENTERING MILITARY SERVICE	1784	10.9	1675	8.5	1580	7.4	1966	9.0
OTHER SPECIFIC PLANS	265	1.6	260	1.3	268	1.3	325	1.5
GRADUATES COMMITTED (Total of above)	15005	91.8	17305	87.2	18097	85.3	21555	97.7
CONSIDERING JOB OFFERS	841	5.1	2309	11.7	2994	14.1	463	2.1
NO OFFERS OR PLANS	498	3.1	217	1.1	126	0.6	51	0.2
TOTALS	16344	100.0	19831	100.0	21226	100.0	22069	100.0

*For 1965 and later years, those employed and entering full-time graduate studies sponsored by employer are included in both categories. Totals for these years are therefore less than the sum of individual categories.

not be particularly meaningful because many schools report that they have no way of knowing this information. Because graduates in this group can be properly counted as both employed and entering graduate school, they are included in both categories but are not double-counted in any of the totals.

Possibly the most significant finding of this survey is the apparent leveling-off of the percentage of new graduates going into graduate study. This has now stayed close to 25% for three years, and thus marks a definite plateau in a curve that had been rising sharply for several years. Whether this will result in a smaller rise in graduate school enrollments, or will be offset by larger numbers of experienced engineers returning to school, remains to be seen.

Placement Status of Engineering Graduates
1967 Compared with Previous Years



* Those employed and entering graduate studies sponsored by employer are included in both categories.

COMPARISONS AMONG FIELDS OF STUDY

In past reports, engineering graduates have been compared with those in physical science and non-technical curricula. Statistics on these latter categories have not been too reliable because the survey did not cover a representative sample of schools offering such programs.

This year it was decided to survey institutions offering degrees in technology at both the two-year and the four-year level. All schools with at least one ECPD-accredited curriculum in engineering technology, and all institutions believed to be offering bachelor of technology programs were included in the survey.

Technology graduates are not quite as fully committed as the engineers, with more reported as still considering employment offers. More of the four-year graduates are going into military service, but the percentage accepting

Placement Status by Field of Study - 1967

PLACEMENT STATUS	ENGINEERING		BACHELOR OF TECHNOLOGY		ASSOCIATE DEGREE IN TECHNOLOGY	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
EMPLOYED	14106	64	893	70	2840	63
FULL-TIME STUDY[1/]	5485	25	123	10	676	15
MILITARY SERVICE	1966	9	138	11	336	7
OTHER SPECIFIC PLANS	325	1	34	3	440	10
GRADUATES COMMITTED (Total of above)	21555	98	1188	93	4292	95
CONSIDERING JOB OFFERS	463	2	77	6	176	4
NO OFFERS OR PLANS	51	*	15	1	59	1
TOTAL WITH STATUS KNOWN	22069	100	1280	100	4527	100
NO INFORMATION	2937	--	140	--	236	--
TOTAL DEGREES AWARDED	25006	--	1420	--	4763	--

Note: Percentages may not add to 100 because of rounding.

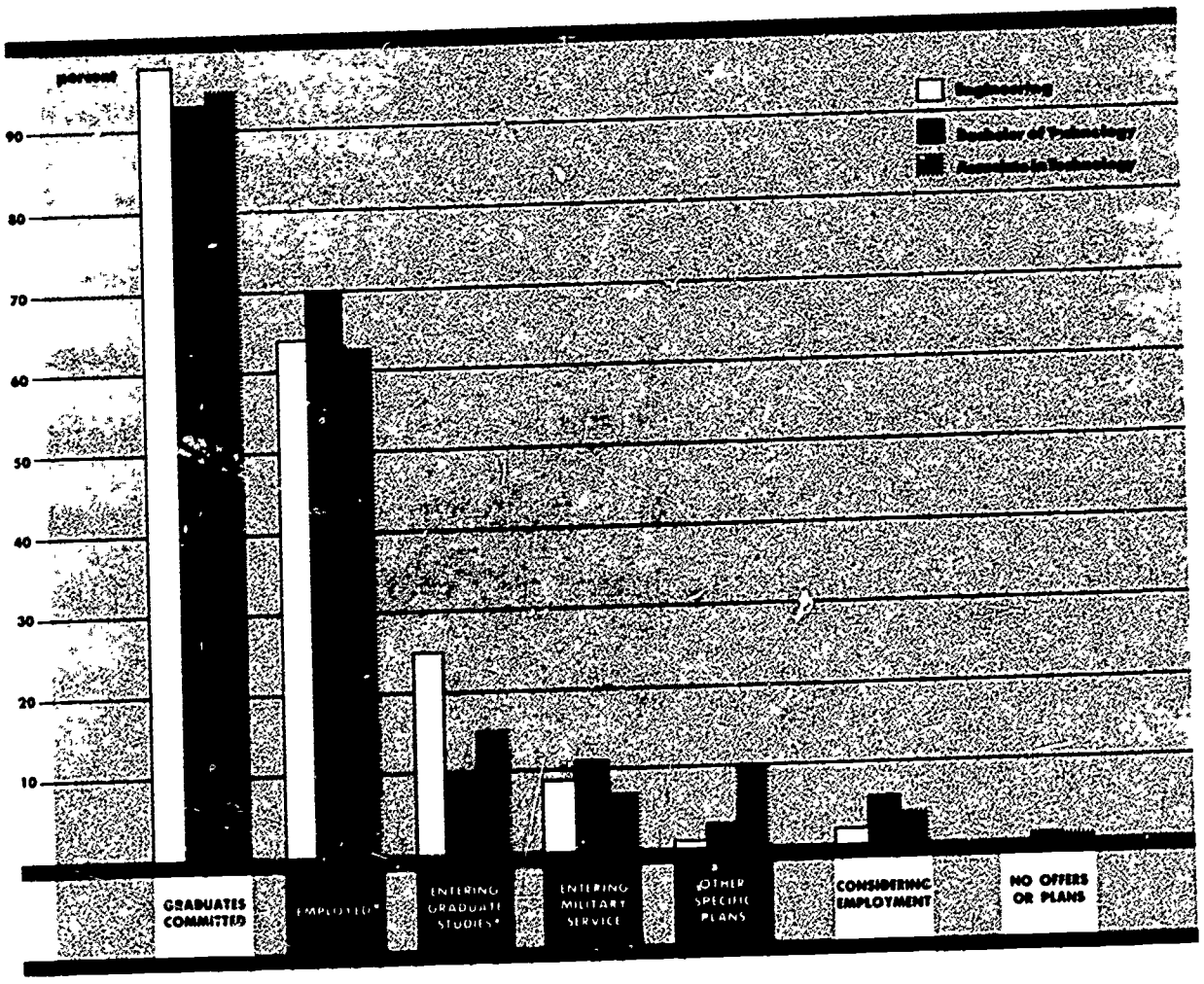
* Less than 1%

1/ This category was listed on the engineering questionnaire only. For the technology students, numbers were written in by respondents. Undoubtedly many technology graduates reported under "Other Specific Plans" are also continuing their studies.

employment is higher than for the engineering graduates. A suprisingly large proportion of both groups of technology graduates are continuing their studies, with 15% of the two-year men and 10% of the four-year graduates reported in this category. This finding is all the more remarkable because the category was not included on the technology questionnaires, but was written in by respondents. It is apparent that many of those reported as having other specific plans are actually continuing in school, so that the actual proportion of two-year graduates studying for a bachelor's degree is probably closer to 25%.

As expected, bachelor of technology graduates are more likely to be seeking employment than are engineering graduates, with 76% of the former either employed or still considering offers of employment, in comparison with only 66% of the engineers.

Placement Status by Field of Study - 1967



* Engineering graduates employed and entering graduate studies sponsored by employer are included in both categories.

ENGINEERING TECHNOLOGY GRADUATES, ASSOCIATE DEGREE LEVEL

This group includes all 47 institutions with ECPD-accredited engineering technology curricula, of which 44 submitted usable replies. Associate programs were also reported from one accredited four-year institution and from six other schools that were surveyed primarily for bachelor of technology programs.

Comparison between the accredited and unaccredited groups indicates higher percentages of the unaccredited graduates accepting employment and having other specific plans. It is believed that the "other plans" of these students may include further study, as respondents had to write in that remark if they wanted to indicate such a status.

Of the seven specific curricular fields plus "all other," the percentage employed ranged from 69 in the electrical and electronic curriculum down to 46 in aerospace. Correspondingly, full-time study claimed 36% of the aerospace graduates, but only 8% of the "all other" group. While considerable variation also existed in other placement status categories, all were uniformly high (93 - 98%) in terms of graduates committed to specific plans.

It is of interest to note that the proportion of graduates about whom no information was known was lower for these two-year technology graduates than for any other group surveyed. The insignificant percentages with no offers or plans indicate the strong demand for technology graduates in all curricula.

Placement Status of Technology Graduates - 1967
ECPD Accredited Institutions

PLACEMENT STATUS		ASSOCIATE DEGREE BY CURRICULUM										
		AERO	CHEM	CIVIL	DRAFTING	ELEC & ELEX	INDUST ENG.	MECH	OTHER[1]	ALL ACCREDITED SCHOOLS	NON ACCREDITED SCHOOLS	ALL SCHOOLS
EMPLOYED	%	46%	61%	61%	57%	69%	60%	58%	59%	63%	70%	63%
	No.	74	108	264	267	1238	35	526	211	2723	117	2840
FULL-TIME STUDY [2]	%	36%	14%	15%	22%	12%	10%	19%	8%	15%	2%	15%
	No.	59	24	64	103	218	6	171	27	672	4	676
MILITARY SERVICE	%	10%	4%	11%	13%	6%	7%	7%	11%	8%	*	7%
	No.	17	7	47	61	99	4	61	39	335	1	336
OTHER SPECIFIC PLANS	%	6%	16%	10%	3%	7%	16%	11%	17%	9%	27%	10%
	No.	9	29	45	16	128	9	97	62	395	45	440
GRADUATES COMMITTED (Total of above)	%	98%	95%	97%	96%	94%	93%	94%	95%	95%	99%	95%
	No.	159	168	420	447	1683	54	855	339	4125	167	4292
CONSIDERING JOB OFFERS	%	2%	2%	3%	3%	5%	7%	5%	3%	4%	*	4%
	No.	3	3	13	16	81	4	43	12	175	1	176
NO OFFERS OR PLANS	%	0%	3%	*	*	2%	0%	2%	1%	2%	0%	1%
	No.	0	5	1	2	32	0	15	4	59	0	59
TOTAL WITH STATUS KNOWN	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	No.	162	176	434	465	1796	58	913	355	4359	168	4527
NO INFORMATION		1	4	42	19	105	0	44	5	220	16	236
TOTAL DEGREES AWARDED		163	180	476	484	1901	58	957	360	4579	184	4763

Note: Percentages may not add to 100 because of rounding.
*Less than 1%

1/ Includes 305 other engineering technology and 55 industrial technology graduates.

2/ This category was not included on the questionnaire but was written in by many respondents. Undoubtedly many of those reported under "Other Specific Plans" are also continuing their studies.

BACHELOR OF TECHNOLOGY GRADUATES

Information on this group was reported from a variety of sources, including 11 schools with ECPD-accredited engineering curricula, three with ECPD-accredited er ,ineering technology programs, and 28 other schools. Of the last group, 23 reported only bachelor of industrial technology graduates.

Comparison of the "ECPD schools" versus the others shows substantially more of the former going on to graduate study and correspondingly fewer entering employment. More of the ECPD groups are entering military services, but other differences are minor.

When the engineering technology graduates are compared with those in industrial technology, the percentages employed are almost identical, but a much greater proportion of the engineering technologists are going into graduate study, while more of the industrial group are entering military service.

The bachelor of technology graduates are the subject of considerable interest because, as their numbers increase, they will fill an increasingly important role in the engineering-technology employment spectrum. These initial findings indicate that the engineering technology graduates are closer to engineers in their placement pattern than might have been expected, but also share many of the characteristics of the industrial technology group.

Placement Status of Bachelor of Technology Graduates - 1967

PLACEMENT STATUS	BACHELOR OF ENGINEERING TECHNOLOGY						BACHELOR OF INDUSTRIAL TECHNOLOGY - TOTAL	
	ECPD SCHOOLS[1]		OTHER SCHOOLS		ALL SCHOOLS			
	No.	%	No.	%	No.	%	No.	%
EMPLOYED	553	68	79	89	632	70	261	69
FULL-TIME STUDY [2]	115	14	0	0	115	13	8	2
MILITARY SERVICE	74	9	4	4	78	9	60	16
OTHER SPECIFIC PLANS	12	1	2	2	14	2	20	5
GRADUATES COMMITTED (Total of above)	754	92	85	96	839	93	349	93
CONSIDERING JOB OFFERS	47	6	4	4	51	6	26	7
NO OFFERS OR PLANS	14	2	0	0	14	2	1	*
TOTAL WITH STATUS KNOWN	815	100	89	100	904	100	376	100
NO INFORMATION	116	--	8	--	124	--	16	--
TOTAL DEGREES AWARDED	931	--	97	--	1028	--	392	--

Note: Percentages may not add to 100 because of rounding.

* Less than 1%

1/ Includes 11 having ECPD-accredited engineering curricula and 3 with ECPD-accredited technology curricula. Currently there are no ECPD-accredited bachelor of engineering technology curricula as such.

2/ This category was not included on the questionnaire. Numbers were written in by respondents. Undoubtedly many of those reported under "Other Specific Plans" are also continuing their studies.

SPECIAL INSTITUTIONS

In addition to the regular civilian engineering schools on the ECPD-accredited curriculum list there are three armed forces academies listed, all of which replied to the EMC survey.

Among the non-ECPD-accredited institutions that give engineering degrees, replies were received from two more armed forces schools, three state maritime academies, and two schools operated by industry primarily for their own employees.

Since all of the foregoing schools have placement patterns that are radically different from the usual civilian engineering school, their returns have not been included in the statistics elsewhere in this report. They are, however, of considerable interest, and are therefore reported separately here.

Industry Schools

One of the two schools reported awarding 21 master's degrees but no bachelor's degrees. The other awarded 409 bachelor's degrees as follows:

CURRICULUM	DEGREES AWARDED
Electrical-electronic	47
Industrial	113
Mechanical	249
Total	409

All graduates were employed while in the program or on graduation.

Military Schools

One of the ECPD-accredited schools reported no bachelor's degrees awarded in June, and one of the non-ECPD accredited institutions did not list any of its graduates as having engineering degrees. The other three reported graduates in the following curricula and also indicated the numbers going into graduate study. All graduates are, of course, employed in military service.

CURRICULUM	DEGREES AWARDED	ENTERING GRADUATE STUDIES
Aerospace	152	19
Chemical	4	1
Civil	24	0
Electrical-Electronic	77	0
Engineering, General	2	0
Engineering Science	57	4
Mechanical	52	10
Naval Architecture & Marine	55	1
Nuclear	31	7
All Other Engineering	63	0
Total	517	42

Maritime Academies

The three schools in this category reported degrees awarded and placement status of graduates as follows:

CURRICULUM	DEGREES AWARDED
Marine Engineering	155
Nuclear Engineering	8
Nautical Science	20
Total	183

PLACEMENT STATUS	NUMBER
Entering employment	175
Graduate studies	1
Military service	7
Total	183

STARTING SALARIES

Beginning salaries for engineers continue to be among the highest of all categories of college graduates. The following table shows salary offers as reported to the College Placement Council by colleges and universities throughout the country.[1] Northwestern University reports an average starting salary for engineers of $712 per month,[2] while the comparable figure from the University of Detroit is $750 for those employed in industry and $640 for those in government.[3]

CURRICULUM	AVERAGE OFFERS DOLLARS PER MONTH 1966-67	1965-66
AERONAUTICAL ENGINEERING	$724	$681
CHEMICAL ENGINEERING	733	682
CIVIL ENGINEERING	706	658
ELECTRICAL ENGINEERING	728	679
INDUSTRIAL ENGINEERING	707	659
MECHANICAL ENGINEERING	720	670
METALLURGICAL ENGINEERING	710	662
PHYSICS, CHEMISTRY, AND MATHEMATICS	691	642
NON-TECHNICAL	614	570

TYPE OF EMPLOYER, ALL CURRICULA (ENGINEERING AND OTHER)	AVERAGE OFFERS DOLLARS PER MONTH 1966-67	1965-66
AEROSPACE AND COMPONENTS	$716	$672
AUTOMOTIVE AND MECHANICAL EQUIPMENT	691	648
CHEMICALS, DRUGS, AND ALLIED PRODUCTS	715	665
CONSTRUCTION AND BUILDING MATERIALS MFGRS.	691	647
ELECTRICAL MACHINERY AND EQUIPMENT	708	661
ELECTRONICS AND INSTRUMENTS	718	670
METALS AND METAL PRODUCTS	683	648
PETROLEUM AND PRODUCTS (INCL. NATURAL GAS)	705	651
RESEARCH/CONSULTING ORGANIZATIONS	705	653
TIRE AND RUBBER	675	639
UTILITIES-PUBLIC (INCL. TRANSPORTATION)	681	634

1. A Study of 1966-67 Beginning Offers, Final Report, June 1967. The College Placement Council, 35 East Elizabeth Avenue, Bethlehem, Pennsylvania 18018.

2. Trends in Employment of College and University Graduates in Business and Industry, 1967. Frank S. Endicott, Director of Placement, Northwestern University, Evanston, Illinois.

3. Their First Jobs After College, 1967. Donald C. Hunt, University of Detroit.

ENGINEERING ENROLLMENTS AND DEGREES

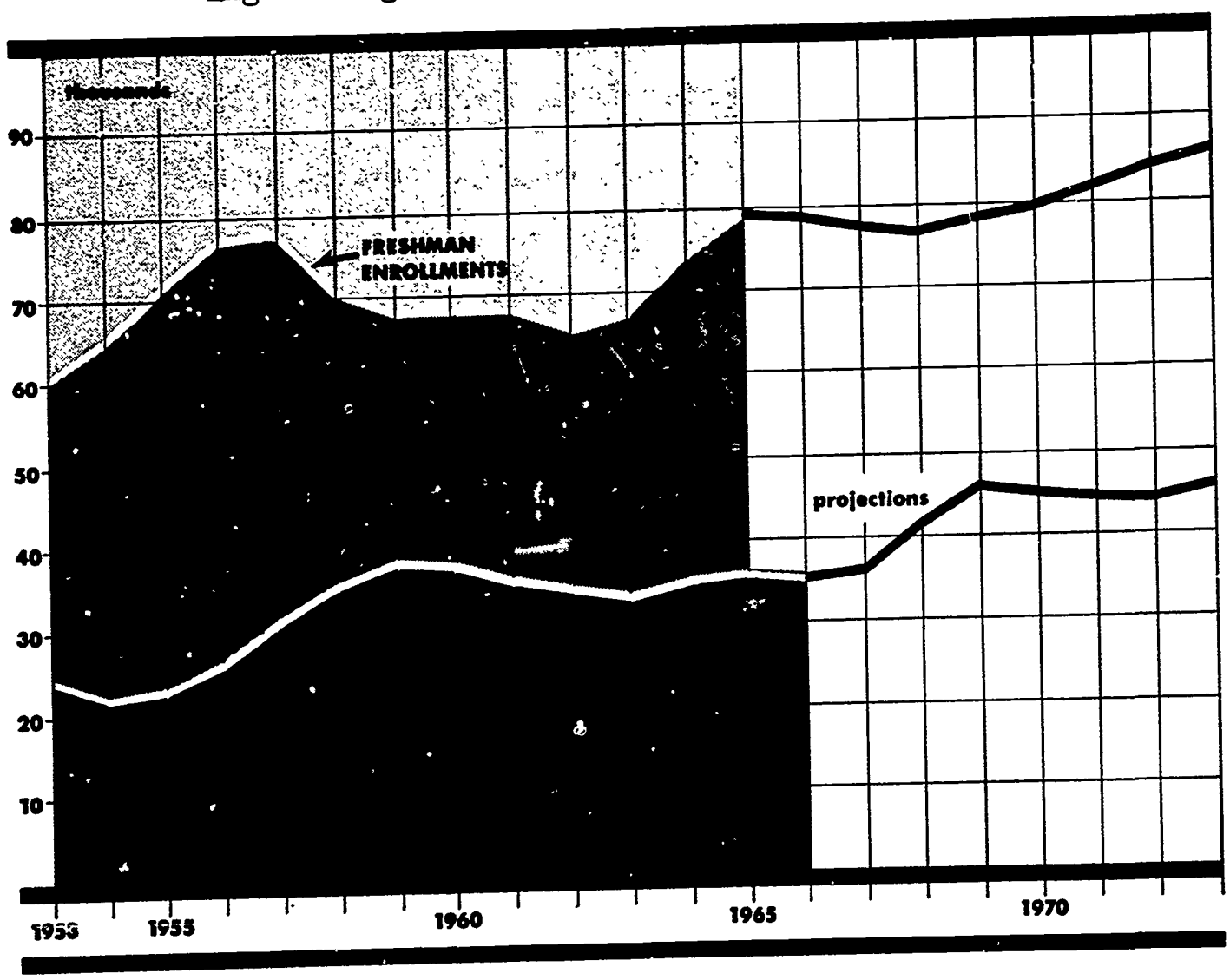
As in previous reports, figures on enrollments and degrees are included to help place the survey in perspective. In the following table, enrollments are as of September of the year indicated. Degrees are those awarded in the twelve months through June 20 of the year shown. EMC projections have been made on the basis of population trends, reported enrollments, and estimates of attrition. Freshman enrollment figures reflect a decrease in the percentage of college freshmen who choose engineering curricula. From 23.3% in 1957, this has dropped steadily to 13.5% in 1965. First degrees are estimated on the basis of their relationship to enrollments four years earlier. This retention rate was 53% in 1965 and is increasing slowly. Advanced degrees are increasing very rapidly at a rate of 11-12% per year.

Engineering Enrollments and Degrees

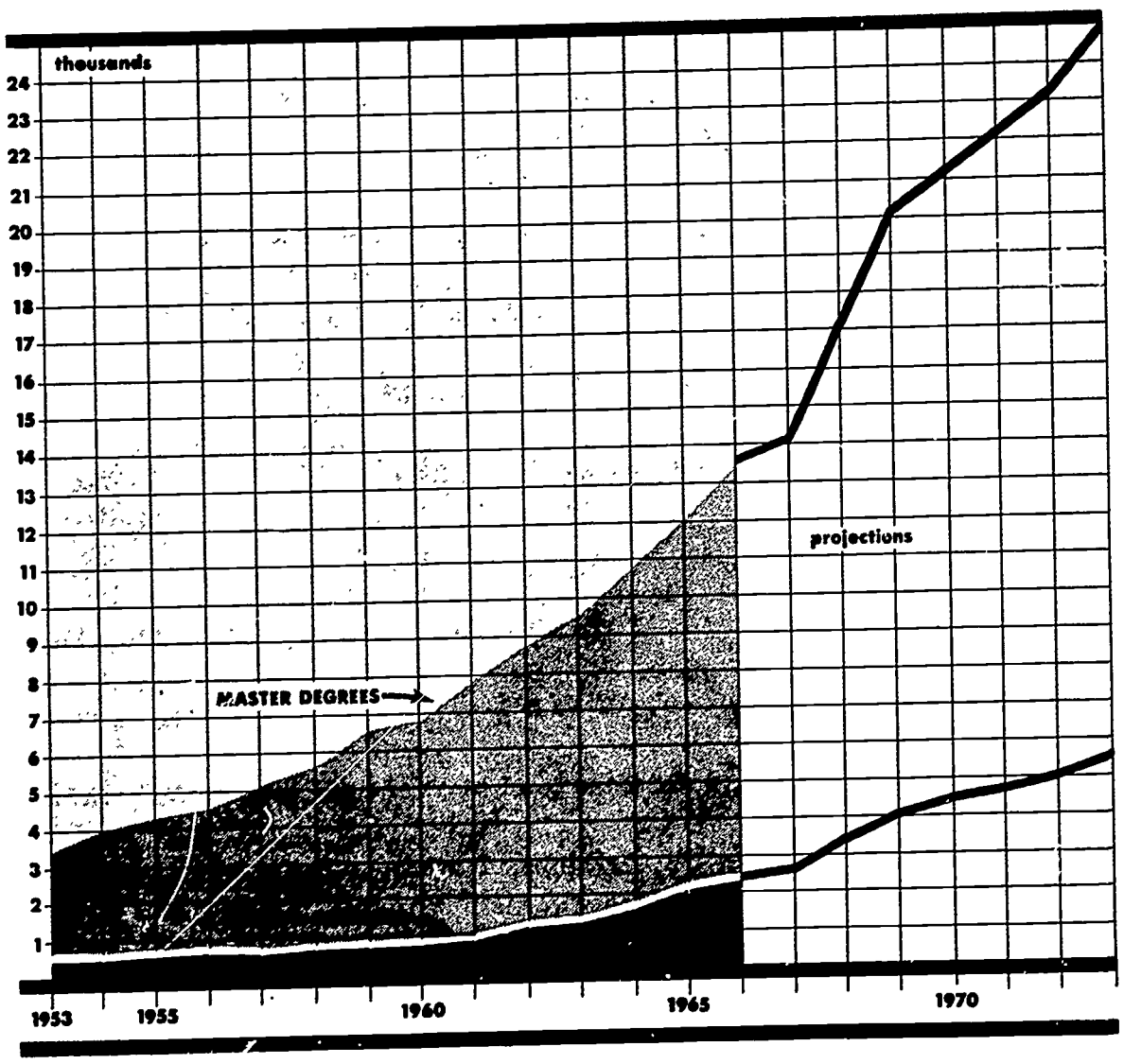
YEAR	FRESHMEN ENROLLMENTS	FIRST DEGREES	MASTER		DOCTOR	
			ENROLLMENTS	DEGREES	ENROLLMENTS	DEGREES
1953	60478	24164	18323	3635	3001	592
1954	65505	22236	17205	4078	3283	590
1955	72825	22589	18482	4379	3163	599
1956	77738	26306	22274	4589	3402	610
1957	78757	31211	23840	5093	4180	596
1958	70029	35332	27833	5669	4763	647
1959	67704	38134	29355	6615	5643	714
1960	67556	37808	30817	6989	6445	786
1961	67575	35860	32054	7977	7869	943
1962	64707	34735	35359	8909	9240	1207
1963	65740	33458	37781	9460	10827	1378
1964	73682	35226	42159	10827	12622	1693
1965	79872	36691	44208	12246	13947	2124
1966	78400*	35815	-	13677	-	2303
PROJECTIONS (EMC ESTIMATES)						
1967	76700	36600	-	14100	-	2700
1968	76000	41000	-	17200	-	3400
1969	77600	45000	-	20100	-	4000
1970	79700	45500	-	21200	-	4400
1971	82100	44800	-	22100	-	4700
1972	84400	44700	-	23200	-	5000
1973	86200	45800	-	24900	-	5500

* 1966 enrollment data not available, EMC estimate given. Degree figures are as reported by U. S. Office of Education.

Engineering Freshman Enrollments and First Degrees



Master's and Doctor's Degrees in Engineering



ANALYSIS OF NON-RESPONDENTS

The high percentage of responses to this survey is particularly gratifying. Of 339 questionnaires sent out, only 23 received no reply at all.

A breakdown of response to the survey is as follows:

	SCHOOLS WITH ECPD-ACCREDITED ENGINEERING CURRICULA	OTHER ENGINEERING SCHOOLS	SCHOOLS WITH ECPD-ACCREDITED ENG. TECHNOLOGY CURRICULA	OTHER SCHOOLS WITH BACHELOR OF TECHNOLOGY PROGRAMS
Questionnaires Sent	180	65	47	47
Usable Replies Received	153	51	44	25
Reported Number of Graduates Only	19	0	3	5
No Bachelor's Degrees Reported	2	2	NA	3
No Program Being Given	0	0	0	7
No Information Available	2	0	0	0
No Reply*	4	12	0	7

A few of the replies counted as usable are not included in the main tables in this report but are mentioned in the section on special schools. Negative replies (no degrees or no programs of the type being surveyed) were received from 14 institutions, while two schools wrote in that they did not have the information requested.

In terms of students covered, for the engineering schools, it is estimated that the non-responding schools accounted for about 2,700 new graduates. From the civilian schools reporting placement status (excluding the armed forces, maritime, and company schools), no information was available on 2,937 graduates.

* One additional reply received too late to be counted.

In the engineering schools surveyed, placement status was known on about 80%. Of the remainder, about 11% were from reporting schools which had simply lost track of these individuals, while 9% were from schools which were unable or unwilling to report status information on any of their engineering graduates.

Of the technology schools, 44 of the 47 with ECPD-accredited curricula reported information covering 95% of their graduates, which is an excellent degree of coverage. The bachelor of technology schools that returned useful replies were able to report the status of 90% of their graduates. It is difficult to estimate the number of graduates from schools which did not respond, as our mailing list of schools offering bachelor of technology programs may not be complete. However, it appears that the number of students not reported in these programs is quite small.

It is pure speculation but reasonable to assume that those students who had made no contact with their dean or placement office probably had such definite future plans that they had no need for placement assistance.

It should be a matter of some concern to engineering educators that 15% of engineering schools are unable or unwilling to respond to a survey of this nature, that a few of those responding state that they have no information at all on the placement of their graduating class, and that the schools which do report useful information have apparently lost contact with about 11% of their graduating students. These three categories of "non-response" represent an absence of data which can only serve to cloud the picture of engineering graduates. To the extent that this may imply a loss of rapport between students and faculty or administration, the situation calls for closer attention on the part of engineering educators to improve the communication between themselves and their students.

Availability of Information on Graduates as Reported by Responding Institutions - 1967

	INFORMATION		NO INFORMATION		TOTAL	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
ALL INSTITUTIONS						
ENGINEERING	22069	88.2	2937	11.8	25006	100.0
BACHELOR OF TECHNOLOGY	1280	90.1	140	9.9	1420	100.0
TECHNICIAN	4527	95.3	236	4.7	4763	100.0
ECPD-ACCREDITED*						
ENGINEERING	20504	88.6	2642	11.4	23146	100.0
BACHELOR OF TECHNOLOGY	815	87.5	116	12.5	931	100.0
TECHNICIAN	4359	95.2	220	4.8	4579	100.0
NON-ECPD-ACCREDITED						
ENGINEERING	1565	84.2	295	15.8	1860	100.0
BACHELOR OF TECHNOLOGY	465	95.1	24	4.9	489	100.0
TECHNICIAN	168	91.3	16	8.7	184	100.0

Note: Armed forces, maritime, and industry schools not included. See page 22.

* Covers all students in any institution having at least one curriculum in engineering or engineering technology accredited by ECPD.

HOW THE SURVEY WAS CONDUCTED

In June, 1967, questionnaires were sent to the deans of all U.S. engineering schools and selected technological institutions with the request that they or their placement directors provide the required information. (Facsimiles of the two forms used will be found on the following page.) Information was requested as of the date of graduation, but not later than June 30, 1967. One follow-up mailing was sent near the end of June. Additional follow-up was limited to obtaining numbers of degrees only for purposes of an interim degree report.1/

Each year some schools do not report and new ones are added. Past studies have shown that this does not cause any material change in the results. There is, however, a possibility that the survey sample may not be entirely representative in that replies inherently come from schools with the best organized placement services and where recruiting is most intensive.

Combined replies from all schools are summarized on the facsimile forms in the back of this report, in addition to the charts and tables in the text.

1/ Published as Engineering Manpower Bulletin Number 8, September 1967. Additional copies available at 50 cents each from Engineering Manpower Commission.

THE PLACEMENT OF ENGINEERING GRADUATES - 1967

Questionnaire Form -- Confidential When Completed

Name of Institution: All Schools With ECPD-Accredited Engineering Curricula (except armed forces institutions)

Reporting Officer: _____

Address: _____

Please complete the form below for all engineering graduates at the bachelor or first degree level of the June, 1967, graduating class. Do not include evening school students. The data should be based on the situation prevailing as of the date of graduation, which will vary among schools. A copy of the results will be mailed to all participants.

PLACEMENT STATUS OF GRADUATES

Number of Schools	Engineering Curriculum or Option	1 No. of Degrees Awarded (Total of Col. 2-10)	EMPLOYED 2 Entering Regular Employment	EMPLOYED 3 Entering Full Time Grad. Studies Sponsored By Employers*	4 Entering Full Time Graduate Studies Exclusive of Column 3**	5 Still Considering Offers of Employment	6 Entering Military Service R.O.T.C.	6 Entering Military Service Other	7 Other Specific Plans	8 No Employment Offers Or Other Plans	9 No Information
36	A Aerospace	881	415	4	228	19	60	45	11	0	99
32	B Agricultural	195	102	1	51	5	7	10	4	0	15
19	C Architectural	296	107	0	42	19	11	32	8	0	77
12	D Ceramic	131	60	2	44	5	7	3	0	0	10
109	E Chemical	2076	1108	17	608	29	62	40	10	4	198
129	F Civil	3397	1885	13	665	50	162	176	56	12	378
136	G Electrical-Electronic	6525	3667	140	1281	118	258	223	107	9	722
22	H Engineering, General	584	343	3	141	8	19	29	5	2	34
45	I Eng. Sci., Phys., Mech.	661	211	12	300	7	17	16	8	0	90
71	J Industrial, admin.-mgt.	1460	650	4	247	21	49	97	40	5	147
132	K Mechanical	4604	2720	55	836	86	186	165	47	10	499
48	L Metallurgical-Materials	533	289	5	142	3	19	9	8	0	58
23	M Min., Geol., Geoph.	200	97	0	39	2	16	7	1	3	35
3	N Naval Arch. and Marine	38	8	0	15	1	1	2	0	0	11
13	O Nuclear	80	30	1	29	3	2	3	0	0	12
13	P Petroleum	77	54	0	6	0	3	0	2	0	12
24	Q All other engineering	265	122	0	35	3	15	35	0	1	54
3	Curricula not separated	1143	539	26	272	30	43	38	3	1	191
151	S Total of Above	23146	12607	283	4981	409	937	930	310	47	2642

For comparison purposes, please provide similar information below on other groups of male graduates identifiable from your records. "Non-technical fields" includes Business and Commerce, Liberal Arts, Biological and Social Sciences, etc.

Other Curricula

11	Engineering Technology	885	515	0	115	45	29	42	10	13	116

* Include only students whose employment involves full-time graduate study at employer's expense. Do not include ordinary scholarships or fellowships where students is not in an employed status.

** Include students employed in an academic capacity (teaching and research assistant) incidental to graduate study.

Please complete and return this form as of date of graduation, but not later than June 30, 1967.

Questionnaire Form -- Confidential When Completed

Name of Institution: All Other Engineering Schools (except armed forces, maritime, and company schools) Reporting Officer: _____

Address: _____

Please complete the form below for all engineering graduates at the bachelor or first degree level of the June, 1967, graduating class. Do not include evening school students. The data should be based on the situation prevailing as of the date of graduation, which will vary among schools. A copy of the results will be mailed to all participants.

PLACEMENT STATUS OF GRADUATES

Number of Schools	Engineering Curriculum or Option	1 No. of Degrees Awarded (Total of Col. 2-10)	EMPLOYED 2 Entering Regular Employment	EMPLOYED 3 Entering Full Time Grad. Studies Sponsored By Employers*	4 Entering Full Time Graduate Studies Exclusive of Column 3**	5 Still Considering Offers of Employment	6 Entering Military Service R.O.T.C.	6 Entering Military Service Other	7 Other Specific Plans	8 No Employment Offers Or Other Plans	9 No Information
6	A Aerospace	96	37	2	8	9	4	3	1	0	32
3	B Agricultural	21	16	0	2	0	1	2	0	0	0
4	C Architectural	119	85	0	8	3	5	3	4	0	11
1	D Ceramic	1	1	0	0	0	0	0	0	0	0
7	E Chemical	48	25	0	12	2	0	1	0	0	8
17	F Civil	214	144	3	20	7	1	4	2	0	33
25	G Electrical-Electronic	485	316	14	33	15	12	7	3	0	85
7	H Engineering, General	113	68	2	29	1	8	0	2	0	3
7	I Eng. Sci., Phys., Mech.	83	51	1	23	0	7	1	0	0	0
9	J Industrial, admin.-mgt.	165	100	9	7	1	5	3	0	2	38
24	K Mechanical	414	285	9	25	12	16	7	1	2	57
2	L Metallurgical-Materials	21	14	1	1	0	4	0	0	0	1
1	M Min., Geol., Geoph.	3	2	0	1	0	0	0	0	0	0
0	N Naval Arch. and Marine	0	0	0	0	0	0	0	0	0	0
0	O Nuclear	0	0	0	0	0	0	0	0	0	0
1	P Petroleum	6	5	0	1	0	0	0	0	0	0
8	Q All other engineering	71	23	3	7	4	5	0	2	0	27
46	S Total of Above	1860	1172	44	177	54	68	31	15	4	295

For comparison purposes, please provide similar information below on other groups of male graduates identifiable from your records. "Non-technical fields" includes Business and Commerce, Liberal Arts, Biological and Social Sciences, etc.

Other Curricula

3	Engineering Technology	53	51	0	0	1	1	0	0	0	0

* Include only students whose employment involves full-time graduate study at employer's expense. Do not include ordinary scholarships or fellowships where students is not in an employed status.

** Include students employed in an academic capacity (teaching and research assistant) incidental to graduate study.

Please complete and return this form as of date of graduation, but not later than June 30, 1967.

THE PLACEMENT OF ENGINEERING TECHNOLOGY GRADUATES - 1967

Questionnaire Form -- Confidential When Completed

Name of Institution: All Schools with ECPD-Accredited Engineering Technology Curricula

Address: _____

Please complete the form below for all graduates of engineering technology curricula of two years duration or longer. Do not include evening students. Data should be based on the situation prevailing as of the date of graduation, which will vary among schools.

Number of Schools	CURRICULUM	No. of Graduates in Each Curriculum	PLACEMENT STATUS OF GRADUATES: Accepted Employment	Still Considering Offers of Employment	Continuing in College	Entering Military Service	Other Specific Plans	No Employment Offers or Other Plans	No Information
	I. Associate Degree or Equivalent								
5	A. Aerospace	163	74	3	59	17	9	0	1
13	B. Chemical	180	108	3	24	7	29	5	4
21	C. Civil	476	264	13	64	47	45	1	42
18	D. Drafting	484	267	16	103	61	16	2	19
44	E. Electrical-Electronic	1901	1238	81	218	99	128	32	105
4	F. Industrial	58	35	4	6	4	9	0	0
26	G. Mechanical	957	526	43	171	61	97	15	44
9	H. Other Engineering Technology	305	174	9	25	32	56	4	5
3	I. Other Industrial Technology	55	37	3	2	7	6	0	0
44	J. Total Associates or Equivalent	4579	2723	175	672	335	395	59	220
	II. Bachelor's Degree in Technology								
3	K. All Engineering Technology	46	38	2	0	3	2	1	0
0	L. All Industrial Technology	0	0	0	0	0	0	0	0
3	M. Total Bachelor's	46	38	2	0	3	2	1	0

Please complete and return this form as of date of graduation, but not later than June 30, 1967. When completed, send to: Engineering Manpower Commission, 345 East 47th Street, New York, New York 10017.

THE PLACEMENT OF ENGINEERING TECHNOLOGY GRADUATES - 1967

Questionnaire Form -- Confidential When Completed

Name of Institution: All Other Technology Schools

Address: _____

Please complete the form below for all graduates of engineering technology curricula of two years duration or longer. Do not include evening students. Data should be based on the situation prevailing as of the date of graduation, which will vary among schools.

Number of Schools	CURRICULUM	No. of Graduates in Each Curriculum	PLACEMENT STATUS OF GRADUATES: Accepted Employment	Still Considering Offers of Employment		Entering Military Service	Other Specific Plans	No Employment Offers or Other Plans	No Information
					Continuing in College				
	I. Associate Degree or Equivalent								
	A. Aerospace								
	B. Chemical								
	C. Civil								
	D. Drafting								
	E. Electrical-Electronic								
	F. Industrial								
	G. Mechanical								
7	H. ALL Engineering Technology	152	96	1	4	1	38	0	12
2	I. ALL Industrial Technology	32	21	0	0	0	7	0	4
7	J. Total Associates or Equivalent	184	117	1	4	1	45	0	16
	II. Bachelor's Degree in Technology								
5	K. All Engineering Technology	44	28	3	0	3	2	0	8
23	L. All Industrial Technology	392	261	26	8	60	20	1	16
25	M. Total Bachelor's	436	289	28	8	63	22	1	24

Please complete and return this form as of date of graduation, but not later than June 30, 1967. When completed, send to: Engineering Manpower Commission, 345 East 47th Street, New York, New York 10017.