




MEMORANDUM

TO: President Edward T. Foote, II

FROM:  George C. Alexandrakis *GEA.*
Chairman, Faculty Senate

DATE: March 15, 1990

SUBJECT: Faculty Senate Legislation # 89009 (B) Establishment of a Master of Science Degree Program in Architectural Engineering

At its meeting of March 5, 1990, the Faculty Senate voted to approve Faculty Senate Legislation # 89009 (B) - Establishment of a Master of Science Degree Program in Architectural Engineering. The text of the legislation is attached for your action.

3/16

*George,
Dom. Thanks*

GCA\ca

Attachment

cc: Provost Luis Glaser
Dean Norman G. Einspruch



Faculty Senate Action # 89009

Class B Legislation

At its meeting of March 5, 1990, the Faculty Senate approved the creation of a Master of Science degree in Architectural Engineering in the College of Engineering. A description of the program is attached.

CAPSULE:

Faculty Senate Legislation #89009 (B) -
Establishment of Science Degree Program in Architectural
Engineering.

RESPONSE BY THE PRESIDENT:

DATE: 3/12/90

APPROVED: Yes *[Signature]*

OFFICE OR INDIVIDUAL TO IMPLEMENT OR PUBLISH: Provost

EFFECTIVE DATE OF LEGISLATION: _____

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED): _____

MSAE

REPORT ON PROPOSED MS DEGREE IN ARCHITECTURAL ENGINEERING
AT
THE UNIVERSITY OF MIAMI

BY
PAUL SEABURG, PH.D., P.E.
PENNSYLVANIA STATE UNIVERSITY

AND
DAVID W. FOWLER, PH.D., P.E.
THE UNIVERSITY OF TEXAS AT AUSTIN



Introduction

The authors visited the University of Miami, May 15 and 16, 1989, to review the proposed MSAE. Meetings were held with the responsible administrators: Provost Glaser, Dean Ferguson, Dean Einspruch, and Dr. Phang, Chairman of Civil and Architectural Engineering. Faculty in the Department of Civil and Architectural Engineering, Mechanical Engineering, Electrical Engineering and the School of Architecture were visited. The authors met with several seniors and graduate students.

The report addresses the need and the available resources. Recommendations are made on the proposed MSAE program.

1. Need for Architectural Engineering

Architectural Engineering programs have been available in some U. S. schools since the early 1900's. In spite of this long history, Architectural Engineering is still an emerging specialty education -- there is room for innovation and flexibility.

There are currently 12 accredited undergraduate programs available with several more under development. The May 1989 issue of Engineering Manpower Bulletin reported enrollments in architectural engineering are growing. In Fall 1988, there were 22,758 undergraduate and 112 graduate students. In the opinion of many in this field, architectural engineering is becoming the best educational base for those persons seeking a career in the building industry.

The concept of architectural engineering education is to provide a broad understanding of total building systems, including the structural systems, environmental systems, construction engineering and elements of architectural design. Persons having this broad background, yet capable of providing in-depth professional services in one of these areas, are highly attractive to

the building profession. It is generally recognized that this type of broad professional competence requires more than the typical 4-year undergraduate engineering program. As a result, several current 5-year programs have developed as Bachelor of Architectural Engineering. Another approach, as proposed by the University of Miami, is to supplement a 4-year undergraduate program with additional coverage of AEN topics in a masters level program. Both approaches can provide the type of professional now needed by the building industry.

It appears that graduates of quality programs are finding many job opportunities. Graduates of Penn State's 5-year BAE program, for example, have multiple job offers well in advance of their graduate dates. Graduates of the Texas 4-year BS plus MS program are also widely sought by the building industry. Graduates of the proposed extended program at Miami should enjoy the same situation. In fact, the strong construction activity in the Miami area should provide a very fertile market for the AE graduates.

2. Adequacy of Resources

The initiation of a successful graduate program requires adequate resources in terms of leadership, faculty, facilities, staff, students, research, and curriculum. Each of these areas will be addressed.

a. Leadership

The primary leadership will come from the department chair. The current chair has demonstrated very good leadership skills during his tenure. He has made some very good faculty hires and has overseen a steady growth in the undergraduate AEN enrollment. He has the respect of faculty and students. He has a sound grasp of the resources and commitment required for the MSAE.

b. Faculty

One of the greatest strengths of the proposed program is the excellent support and cooperation provided by faculty in related disciplines - Electrical Engineering, Mechanical Engineering, and Architecture. Each faculty member from these areas expressed the view that the MSAE would not be a burden but, in fact, would permit the addition of courses that would benefit their programs.

The Architectural Engineering faculty are competent, dedicated, and highly supportive of the MSAE. The quality of the faculty is adequate to teach the courses.

The proposal calls for no new faculty positions until the fall of 1992. The additional teaching load will be accomplished by using adjunct faculty, hired at nominal cost, to teach undergraduate courses to provide course relief for the permanent faculty. It is likely that more than one additional faculty will be required by 1992, or soon thereafter,

but the additional student credit hours should provide the necessary justification. Some of the teaching load will be due to the supervision of thesis research and monitoring of the individual study required in the non-thesis option.

A minimum of one teaching assistant is required in the next two or three years. This position can be used to provide funding for supporting a quality graduate student.

c. Facilities

Department facilities are adequate for the first few years. Excellent computer facilities are available, and the construction of the addition to McArthur Hall will provide laboratory space for heating and air conditioning research which will be available to AEN graduate students. Laboratory space and equipment for structural research is minimal and must be increased as the program grows.

Library resources appear to be adequate for the program.

d. Staff

Currently the staff for the Civil and Architectural Engineering programs consists of three secretaries assisted by a few work study students. There is an urgent need for a technician to manage and maintain the computers and laboratories. Faculty and graduate students currently perform these duties. The four machinists provided by the College cannot provide the needed services for the Department. A departmental technician will be needed in the near term. Additional technical staff can be furnished from research.

e. Students

One of the greatest needs will be quality graduate students. Currently, three to five Miami BSAE graduates each year attend graduate school at Miami or elsewhere. It is quite likely that several others would pursue the MSAE at Miami if the programs were available. There are 45 to 50 BSAE graduates each year and 5 to 10 are prospective graduate students. The state support for undergraduate tuition subsidies, which is expected to begin in the fall of 1989, should provide a stable pool of undergraduates.

If Miami implements the MSAE, it will be the only such program in the southeast with Penn State and Texas being the nearest programs. The expected continued growth of the southeastern states, particularly Florida, will insure above average building activity which will insure a demand for MSAE graduates.

f. Funded Research

Increased research funding will be very important in developing a quality MS program. Research will provide financial support for graduate students which is essential to (1) compete for the top BS graduates; (2) provide equipment, materials and technical staff; and (3) provide meaningful research topics for students. In addition, faculty support

will permit a reduction in teaching loads.

With the program focus on environmental systems and integration of building systems, there is an excellent opportunity for attracting research from the building industry: prefabricated building manufacturers, material suppliers, construction firms, state and federal agencies, heating and air conditioning equipment manufacturers and developers.

g. Curriculum

The proposal includes both a thesis option and a non-thesis option. Each option requires 9 hours of environmental control electives which include new courses in illumination and building acoustics and existing courses: acoustics, solar energy, and air conditioning design. Each option requires a minimum of two courses in integrated building/systems engineering. Three new courses are proposed in the areas of building equipment and environmental systems; structures; and construction. A minimum of 9 hours of AEN electives are required, which can be taken from a wide range of courses in architecture or architectural engineering, civil engineering, mechanical engineering, industrial engineering, and management. Students have considerable flexibility, but the required courses will provide a focus which is clearly on buildings and will not duplicate the current MS program in Civil Engineering.

The proposed courses are well-defined and will be sufficient for the program in the first few years. As the program grows, other courses will probably be required. Construction management, for example, should be a very popular area based on the large construction industry in South Florida.

3. Recommendations and Suggestions

It is the opinion of the authors that the University of Miami should proceed with the introduction of an MS program in Architectural Engineering. In support of this the following suggestions are offered:

a. Course Control

It is critical that courses provided by other departments, i.e., Architecture, Mechanical Engineering and others, be organized and controlled such that course content and teaching faculty relate to building applications as required by the AEN program. Supporting departments must maintain a strong commitment to serve the needs of AEN graduate students. Laboratory space and facilities should also be made available to support related research.

b. Research

An attempt should be made to develop a unique research focus for the program which is appropriate for architectural engineering and uses the building systems knowledge of the faculty and graduate students. This might involve interdisciplinary approaches using the talents of the departments involved with the curriculum.

c. Design Projects

Consideration should be given to allowing design projects as alternatives to research theses. Practice in innovative design may be far more beneficial to graduates entering professional practice than limited exposure to research.

d. Course Rigor

Care should be taken to insure that new graduate courses have sufficient rigor for this level. It is apparent that new topics will be introduced to the curriculum at the graduate level. These should be taught at a sufficiently high level and taken to sufficient depth to qualify for graduate credit.

e. Student Deficiencies

A formal policy should be developed for identifying academic deficiencies for incoming students with backgrounds other than architectural engineering to insure that the objectives of an architectural engineering education are not compromised at the MS level.

f. Faculty

All faculty actively participating in this program should have professional experience with building applications and a clear understanding of the educational objectives of an architectural engineering program.

g. Short Courses

A series of continuing education short courses should be developed to attract representation from industries who (1) have employees who are potential graduate students, (2) are potential employers, or (3) are potential research sponsors.

h. Student Recruitment

A well-conceived publicity program should be developed to attract quality graduate students from other AEN BS programs and other programs in building construction, civil engineering, and architecture, particularly in the southeast.

i. Publicity

Potential employers and research sponsors should be made aware of the new program by adequate publicity, including sending abstracts of theses and reports and copies of published papers. An annual reception at which well-prepared presentations

are made on selected research activities by the faculty should be considered.



FILE COPY

MEMORANDUM

TO: President Edward T. Foote, II

FROM: George C. Alexandrakis *GCA*
Chairman, Faculty Senate

DATE: March 15, 1990

SUBJECT: Establishment of the Master of Science Degree Program in
Architectural Engineering

The Senate proposed and Dr. Phang, Chair of the Department of Civil and Architectural Engineering, agreed that the cost for books and periodicals, at least initially, will be met from the Department budget.

GCA\ca



Executive

COMMITTEE

April 17, 1990

MEETING DATE

BOARD OF TRUSTEES

SUBJECT:

Establishment of a Master of Science Degree in
Architectural Engineering

PRESENTED BY: Luis Glaser, Provost

BACKGROUND/CURRENT STATUS/MATTERS REQUIRING ACTION/
FINANCIAL IMPLICATIONS:

The proposed degree was approved by the Graduate Council on September 13, 1989; the Faculty Senate on March 5, 1990; and President Foote on March 12, 1990.

A summary and revised budget are attached; a full copy of the proposal will be available at the meeting.

BOARD RESOLUTION REQUESTED:

Approval of the Master of Science Degree in Architectural Engineering.

SUMMARY OF PROPOSAL FOR MASTER OF SCIENCE IN ARCHITECTURAL ENGINEERING

Rationale

There is a growing demand for graduate students trained in Architectural Engineering by the building industry, government, and educational institutions. Currently there are only 12 accredited undergraduate programs in Architectural Engineering. (Accreditation applies only for undergraduate programs, and the program at the University of Miami is accredited.) Only six of these schools currently offer graduate degrees. No graduate degree in Architectural Engineering is offered in the Southeast. The demand for such programs is evidenced by the significant increase in undergraduate Architectural Engineering majors in recent years. They currently outnumber the number of Civil Engineering majors at the University of Miami. Many of these students are interested in continuing their training. In addition, industry is demanding graduates with more expertise than can be gained from earning an undergraduate degree.

The students in the proposed Master of Science in Architectural Engineering will receive interdisciplinary training in analysis and design of buildings, building materials, building services, environmental systems of buildings (heating, ventilation, and air conditioning, HVAC), and integrated building systems. To quote the proposal: "Graduate students will produce valuable research which will help to narrow the communication gap between architects and engineers, as well as between engineers of different fields who must work together in the design and structure of buildings."

There is a strong local need in the building area for expertise in such individual areas. The proposal calls for a first-year enrollment of 10 students. Within three years the total enrollment is projected at 23 students per year. There seems to be an adequate pool of students to warrant this projection.

Curriculum

The curriculum is carefully designed. Students may opt for a 30-credit thesis option or a 36-credit non-thesis option. Most students will be encouraged to pursue the thesis option. The Master's degree should be completed within two years. Course scheduling for the first three years was provided in the proposal and indicates that adequate offerings will be provided.

The curriculum provides that minimums of 6 credits in integrated building systems and 9 credits in environmental control must be taken by each student. These areas are well chosen since there is a public demand for expertise in these areas and current faculty expertise exists already at the University. Six new courses will be offered in the Department of Civil and Architectural Engineering. (Syllabi were included in the

proposal). In addition, students will take courses in Architecture, Mechanical, or Electrical Engineering. Letters of support from the School of Architecture and the departments of Mechanical and Industrial Engineering were also included in the report. Sample tracks of study for students were also provided. Both the faculty review committee and the external reviewers felt the proposed curriculum is sound.

Faculty

There is adequate faculty to initiate this program. However, additional faculty will be required by the third year when enrollment reaches its steady state. There is provision for hiring one additional faculty in the third year. During the first two years a modest number of courses will be taught by adjuncts. Brief vitae for these adjuncts were provided. The external reviewers felt that the adjuncts will be satisfactory for the first few years but should be used primarily to teach undergraduates, freeing the permanent faculty for new graduate courses. The faculty review committee concurs that adjuncts should have academic credentials commensurate with their participation in the program.

The faculty committee and outside reviewers felt the program could begin with the current faculty, but at least one additional faculty member must be hired the third year. The faculty to be involved are enthusiastic and highly qualified. The department should consider the balance between this program and civil engineering. Dependent on the success of this program, the department may desire to shift the faculty toward this specialty.

Physical Facilities and Research

The faculty review committee and the external reviewers visited the facilities. These will be adequate to support the program at the proposed size, especially when the new engineering building is complete. The computer facility has been recently upgraded and is good. The external reviewers felt laboratory space and equipment for structural research should be increased as the program grows. Money has been budgeted for this. Adequate space is also available for student offices.

Growth in research activities to provide both problems for theses and infrastructure in terms of equipment and technical staff should be emphasized. Research funding should provide a sizeable portion of the technical costs associated with the graduate program.

Budget

A three-year budget is presented which seems fiscally sound and reasonable. There is allowance for hiring faculty during the

third year. There is provision for three teaching assistants each year once the program is at full enrollment. Appropriate funds have been allocated for publications and advertising.

Comparisons

The proposal provided comparisons with existing programs at the University of Texas at Austin and the University of Colorado at Boulder. These schools offer specialties similar to those proposed at the University of Miami. The program proposed at Miami compares well.

PROJECTED REVENUES AND EXPENDITURES

1989

	<u>Revenues</u>	<u>Expenditures</u>
Student Credit Hour Generation: 45 credit hours @ \$478.00	\$ 21,510	
P.T. Faculty Salaries: 2 Courses @ \$2,400		\$ 4,800
T.A. Tuition/Stipend: 9 credit hrs. @ \$478.00 Stipends @ 46,570		4,302 3,285
Laboratory Expenses: Equipment for AEN Laboratory Laboratory Operating Expenses		20,000 4,000
Miscellaneous Operating Expenses: Office, Secretarial, etc. Program Advertising Library Acquisitions		3,000 3,000 2,000
1989 - Totals	\$ 21,510	\$ 44,387

1990

	<u>Revenues</u>	<u>Expenditures</u>
Student Credit Hour Generation: 219 credit hours @ \$500.00	\$109,500	
P.T. Faculty Salaries: 4 courses @ \$2,520		\$ 10,080
T.A. Tuition/Stipends: 39 credit hrs. @ \$500 Stipends for 2 TA's @ \$6,900		19,500 13,800
Laboratory Expenses: Laboratory Operating Expenses		4,200
Miscellaneous Operating Expenses: Office, Secretarial, etc. Program Advertising Library Acquisitions		3,150 3,150 2,300
1990 - Totals	\$109,500	\$ 56,180

1991

	<u>Revenues</u>	<u>Expenditures</u>
Student Credit Hour Generation: 321 credit hours @ 550.00	\$176,550	
P.T. Faculty Salaries: 4 courses @ \$2,646		\$ 10,580
T.A. Tuition/Stipends: 39 credit hrs. @ 550 Stipends for 2 @ \$7,245		21,450 14,490
Laboratory Expenses: New equipment purchases for AEN laboratory Laboratory Operating Expenses		12,000 4,410
Miscellaneous Expenses: Office, secretarial, etc. Program Advertising Library Acquisition		3,300 3,300 2,650
1991 - Totals	\$176,550	\$ 72,180

1992

	<u>Revenues</u>	<u>Expenditures</u>
Student Credit Hour Generation 384 credit hours @ 605.00	\$232,320	
New Faculty: Salary \$46,000 /9 mos. & fringe benefits @ 26% Equipment support and Grant		\$ 57,960 20,000
T.A. tuition/Stipend: 60 credit hrs. @ 605.00 Stipends for 3 @ 7,610		36,300 22,830
Laboratory Expenses: Laboratory operating expenses		4,630
Miscellaneous Operating Expenses: Office, secretarial, etc. Travel Program Advertising Library Acquisitions		3,500 2,000 3,500 3,050
1992 - Totals	\$232,320	\$153,770

1993

	<u>Revenues</u>	<u>Expenditures</u>
Student Credit Hour Generation: 384 credit hours @ 666.00	\$255,744	
Faculty Salary:		\$ 61,000
T.A. Tuition/Stipends: 60 credit hrs. @ 666.00 Stipends for 3 @ \$8,000		39,960 24,000
Laboratory Expenses: New Equipment Purchases for AEN Laboratory Laboratory Operating Expenses		12,000 4,860
Miscellaneous Operating Expenses Office, secretarial, etc. Travel Advertising Library Acquisitions		3,700 2,200 3,700 <u>3,500</u>
1993 - Totals	\$255,744	\$154,920

Notes:

1. Tuition increases are assumed to be approximately 10% per year.
2. Faculty salaries and stipends for teaching assistants are assumed to increase approximately 5% per year.
3. Operating expenses are assumed to increase approximately 5% per year.
4. Library acquisitions are increased approximately 15% per year.

F.1 NEED FOR ADDITIONAL FACULTY AND ASSOCIATE COST

After the program has been in operation, it is proposed that in 1992 a permanent faculty position be introduced to cover the areas taught by the adjunct faculty members. With the anticipated faculty research work, one time initiation grant for equipment is also included. It is also anticipated that additional incremental travel expenses will be needed.

F.2 SUPPORT FOR T.A. TUITION/STIPENDS

Two teaching assistantships are proposed to support the MSAE program. An additional teaching assistantship is anticipated by 1992.

After further discussion, it was *moved* and seconded that the entire faculty be informed of the state of the budget by distributing the Budget Committee's report. *The motion was amended* to direct the Senate Council to set a date for a meeting of the Faculty Senate to which the general Faculty ought to be invited to discuss the future of the University, and to distribute the Budget Committee report before the meeting. *The amended motion carried with one opposing vote.*

After discussion it was *moved* and seconded that the Senate request a meeting for this Spring of appropriate representatives of the faculty with the Chairman and Vice-Chairman of the Board, and the Chairmen of the Budget and Finance Committee and the Executive Committee to communicate the faculty perspective on the state of the University. *The motion carried.*

Some of the Senators felt that the Issues Committee was going to be ineffective in improving the communication channels between the Faculty and the Administration. Others believed in the necessity of Trustees' participation on the Committee. After considerable discussion on the merits of the participation of the faculty on the Issues Committee, it was *moved* and seconded to accept the Issues Committee as proposed by the President. An *amendment* to request that the Committee be co-chaired by the Provost and the Chair of the Faculty Senate was proposed. *The motion as amended carried.*

Proposal for the Establishment of Master of Science Program in Architectural Engineering


The Chair introduced Professor Phang, Chair of Civil and Architectural Engineering. Professor Alexandrakis explained that the Council recommended the proposal to the Senate provided that certain budgetary aspects were clarified. Professor Lopez-Gottardi, Chair of the Sub-Committee of the Council on the Master Science Degree in Architectural Engineering reported that no net expenditure increase was necessary. It was *moved* and seconded to approve the first reading. *The motion carried.*

UNIVERSITY OF
Miami
MEMORANDUM

FILE COPY

DATE: January 25, 1990

TO: Professor Tomas L. Lopez-Gottardi, Chair
Sub-Committee on M.S. Degree in Architectural Engineering
Faculty Senate Council

VIA: Dr. Norman G. Einspruch, Dean *M 1/30/90*
College of Engineering 

FROM: Dr. Michael K. Phang, Chairman
Department of Civil & Architectural Engineering

SUBJECT: Proposal for M.S. Degree in Architectural Engineering

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The increase in revenue represents a windfall for the University since there will be no addition made to the total departmental resources expended for all of its programs. The needs for the proposed program will be handled through internal reallocation of resources by the department. Other monetary support, such as student tuition waivers and operating and laboratory expenses, will also be committed for this program by the department from its current resource base.

MKP/oc

cc: Dr. George C. Alexandrakis, Chair, Faculty Senate ✓
Dr. Luis Glaser, Executive Vice-President and Provost



SCHOOL OF ARCHITECTURE
(305) 284-3438
Post Office Box 249178
Coral Gables, FL 33124-5010

MEMORANDUM
January 18, 1990

TO: Faculty Senate Council
FROM: Professor Tomas L. Lopez-Gottardi
SUBJECT: M. S. in Architectural Engineering

I submit this report in behalf of the Faculty Senate Committee commissioned to evaluate the proposal for a Master of Science Degree Program in Architectural Engineering.

The Committee, Professors De Santis, Forman and myself, met on December 14, 1989, to evaluate the proposal. It produced a list of eleven questions which were agreed to be presented to the Department of Civil and Architectural Engineering. On December 21, 1989, I met with Professors Phang, Soltani and Suaris of the Department of Civil and Architectural Engineering and presented the list which is herein attached.

On January 11, 1990, Professor De Santis and myself (Professor Forman could not attend the scheduled meeting due to an unexpected court appearance) met with Dr. Phang. Dr. Phang presented a written report to the committee's questions and each of the eleven questions was discussed in detail.

Notwithstanding some areas of concern, Professor De Santis and myself support the proposal and we so recommend to the Senate Council.

TLLG/bk

Attachments: Faculty Senate Committee: Issues
Response by the Department of Civil and Architectural Engineering

PROPOSED MASTER OF SCIENCE IN ARCHITECTURAL ENGINEERING
FACULTY SENATE COMMITTEE: ISSUES

1. Number of electives permitted by the proposed curriculum (page 8)
2. Number of 500's courses rather than 600's
3. Different number of credit required for the Thesis and the Non-thesis options (page 8)
4. Spell out admission requirements (page 13)
5. Number of graduate assistants (page 13)
6. The number of student stipends provided and their amount. Also, tuition is actually higher than the one stated (page 18)
7. "All" should read "full" (page 41)
8. Salaries of part-time faculty too low (page 18)
9. Salary of new (full-time) faculty too low (page 19)
10. Library budget too low. Importance of the journals listed (page 18 and 19)
11. Effect of the new program on the course load of the present faculty of the department



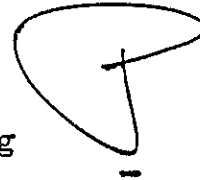
MEMORANDUM

DATE: January 5, 1990

TO: Professor Tomas L. Lopez-Gottardi
School of Architecture

FROM: Dr. Michael K. Phang, Chairman
Dept. of Civil and Architectural Engineering

SUBJECT: Proposed MSAE Program



=====

As you requested, I am forwarding the response to comments made by the Faculty Senate Committee on the proposal for the MSAE program. Please note that numbers refer to the similarly listed items in attached questions/comments.

MKP/oc
Enclosure

cc: Dr. Norman G. Einspruch, Dean
CAE Faculty

**Response to Comments/Questions Made by the Faculty Senate Committee
on the Proposal for the MSAE Program**

1. (Page 8)

The curriculum was developed around the two key areas of concentration: Integrated Building/Systems Engineering and Environmental Control. The actual courses selected within these areas would depend on the students academic backgrounds and areas of specialization, i.e., Architectural Engineering, Civil Engineering, Mechanical Engineering, Construction, Architecture. The electives (9 credits for the thesis option and 21 credits for the non-thesis option) are to be selected from any of the key areas listed in Page 9.

Master's Thesis is spelled out for AEN 710 in Page 8.

2. (Page 9)

We currently have only 400 level (undergraduate) Architectural Engineering courses. It would be logical to introduce 500 level (Masters) courses first. These are offered to our starting graduate students as well as to our advanced undergraduate students. This would help meet the enrollment requirement in these courses. The 600 level courses are for doctoral programs in the College of Engineering.

3. (Page 8)

According to the current University of Miami graduate requirements, the thesis option requires 24 credit hours of coursework and 6 thesis credits. The non-thesis option requires 36 credit hours of coursework.

4. (Page 13)

In addition to holding a baccalaureate degree from an accredited institution, the applicant for admission to the MSAE Program should have an undergraduate major in Architectural Engineering, or closely related engineering fields or equivalent. Students having a major other than in Architectural Engineering will be required to complete certain deficiency courses as determined by the Graduate Studies Committee in the Department of Civil & Architectural Engineering.

The undergraduate scholarship record should be exceptionally good, especially in the major subject and in allied courses. All applicants for admission to the Graduate School are also required to submit recent Graduate Record Examination scores. International applicants will be required to give evidence of TOEFL score in addition to GRE score.

5. (Page 13 and revised budget)

The proposed budget provides for two teaching assistants during the first two years and for three teaching assistants thereafter. We feel this is adequate.

7. (Page 41)

Corrected to full and not all.

6, 8, 9 and 10. (Pages 18, 19 and 20)

- (a) See attached revised budget.
- (b) The current College of Engineering student stipend is at \$6,570.
- (c) The current tuition fee is \$478 per credit hour.
- (d) The going rate of P.T. faculty salary is \$800 per credit hour.
- (e) New faculty salary is increased to \$46,000 from \$40,000.
- (f) Library budget is increased modestly. Major journals listed in pages 3 and 4 are current and more than adequate.

11. (a) Regular faculty members would be teaching some courses as their course load, however, the load would be reduced when current undergraduate courses in the department would be offered once a year instead of twice a year as done now. This will be effective in the fall of 1990.
- (b) Some courses would be taught by adjunct faculty from other departments.
- (c) Some courses would be handled by part-time faculty. They would however be phased out when the new faculty member is hired.

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Notes:

1. Tuition increases are assumed to be approximately 10% per year.
2. Faculty salaries and stipends for teaching assistants are assumed to increase approximately 5% per year.
3. Operating expenses are assumed to increase approximately 5% per year.
4. Library acquisitions are increased approximately 15% per year.

F.1 NEED FOR ADDITIONAL FACULTY AND ASSOCIATE COST

After the program has been in operation, it is proposed that in 1992 a permanent faculty position be introduced to cover the areas taught by the adjunct faculty members. With the anticipated faculty research work, one time initiation grant for equipment is also included. It is also anticipated that additional incremental travel expenses will be needed.

F.2 SUPPORT FOR T.A. TUITION/STIPENDS

Two teaching assistantships are proposed to support the MSAE program. An additional teaching assistantship is anticipated by 1992.

SENATE COUNCIL MEETING

November 27, 1989

PRESENT: Professors Alexandrakis, Awad, Boardman, Burgess, Clasby, Carlebach, DeSantis, Dreyer, Eckstein, Forman, Lopez-Gottardi, Neider, Seiler.

ABSENT: Professors Brass and Clingan.

GUESTS: Professors Baker, Einspruch, Glaser, Murfin, Phang, Sugrue and Yacoub.

Call to Order and Approval of Minutes

The meeting was called to order at 2:05 P.M. by Professor Alexandrakis. The minutes of November 13 were approved as submitted. Excused absences were approved for Professors Brass and Clingan.

Report on the Status of the Budget

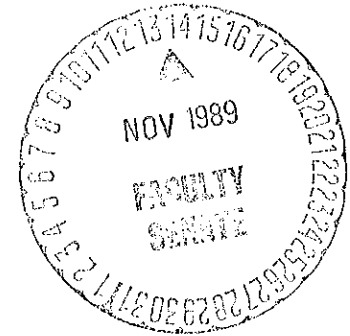
The Chairman requested that Provost Glaser's report be given in Executive Session.

Proposal for a Master's Program in Architectural Engineering

Dean Einspruch and Professor Phang presented the proposal for a Master's Program in Architectural Engineering. Professor Alexandrakis will appoint a sub-committee of the Council to review the proposal and make a recommendation to the Senate as soon as possible. The members of the sub-committee are Professors Tomas Lopez-Gottardi, Chair, DeSantis and Forman.

Report from the Library Committee

Professor Edward Baker, Chair of the Library Committee, presented the Committee's report. He noted that the University Libraries have dropped in the ARL rankings over the past five years from the mid-sixties to the high seventies. He noted three areas of improvement: increase in number of staff members, commitment for computerization of Richter Library, and plans for an addition to the Library. It was suggested that the Central Administration should raise an endowment for the Library in order to fund improvements in the collection. The Council accepted the report and will invite Professor Baker to present the report to the Senate.



Executive Vice President and Provost

M E M O R A N D U M

November 15, 1989

TO: Dr. George Alexandrakis
Chairman, Faculty Senate

FROM: Luis Glaser
Executive Vice President
and Provost

A handwritten signature in cursive script, appearing to read "Luis".

SUBJECT: Master's Program in Architectural Engineering

Please find enclosed the extensive material prepared for the Master's Program in Architectural Engineering, which comes with the enthusiastic recommendation of the Graduate School as well as my own. Please note that external reviewers visited the program and recommended it with enthusiasm.

We would like to proceed on this as rapidly as possible and I appreciate any help that the Senate can give us in this matter.

LG:nh

Enclosure



PAUL A. SEABURG

548 Westgate Drive

State College, Pennsylvania 16803

Phone: 814/237-4671

- - EXPERIENCE - -

1985- The Pennsylvania State University, Department of Architectural Engineering.

Department Head and Professor, full administrative responsibility for teaching, research and service activities of the Department of Architectural Engineering faculty and staff.

- Total faculty of 14; staff of 17
- 330 undergraduate students; 22 graduate students
- Annual budget approximately \$1,000,000
- Annual research expenditures exceed \$750,000

1979 .Armco Atlantic, Inc., Cincinnati, Ohio.
-85 (now Building Technologies)

General Supervisor of Product Research and Development, responsible for all phases of PR&D including design, testing, product literature, and engineer/sales training.

- Developed four new building lines with sales exceeding \$12 million
- Developed approach and components for re-roofing
- Managed the supporting activities of Armco Research and other outside agencies
- Tested existing products to improve cost-effectiveness and methods of design
- Served on industry research and specification committees
- Received three US and several related Foreign patents

1977 United Nations Educational, Scientific and Cultural
-78 Organization, Cairo, Egypt.

Expert on Continuing Education of Engineers, responsible for developing the Arab States portion of an \$800,000 International Programme on Environmental Education and Training of Engineers.

- Extensive contacts and travel throughout Middle East
- Initiated funded programs at five major Universities
- Organized short course at University of Alexandria

1969 The University of Wisconsin, Milwaukee, Wisconsin.
-79

Associate Professor, held joint appointments with the College of Applied Science and Engineering and the UW-Extension with both teaching and administrative responsibilities.

- Originated self-supporting continuing education programs serving 1000 engineers annually
- Taught undergraduate and graduate civil engineering courses on Milwaukee Campus
- Conducted externally funded research and education programs.

1965 Inland Steel Products, Milwaukee, Wisconsin.
-67

Manager R&D for Building Panels, responsible for design criteria and new applications of composite steel floor decks.

- Developed design approach for applications with composite steel beams
- Verified designs for major high rise projects including First National Bank in Chicago

1959 Homer Research Laboratories of Bethlehem Steel Corp,
-65 Bethlehem, Pennsylvania.

Research Engineer, developed new construction products and provided technical support for Sales Engineering.

- Developed new designs for steel joists
- Designed original Bethlehem Bridgeform product
- Wrote steel design references widely used in engineering design offices
- Received US patents

1957 U.S. Army Corps of Engineers, Fort Belvoir, Virginia
-59 Military service as Second/First Lieutenant.

- - EDUCATION - -

The University of Minnesota: B.S. with high distinction-1956
M.S.C.E.-1957

Lehigh University: Part-time graduate study in structural engineering 1962-65

The University of Wisconsin: PhD major in structural engineering and minor in engineering mechanics-1969

- - PROFESSIONAL ACTIVITIES - -

PATENTS: U.S. No. 3,496,691 Concrete Forms 2/24/70
U.S. No. 3,498,015 Poured Gypsum Roof Structure 3/3/70
U.S. No. 4,349,996 Integrated Roof System 5/82
U.S. No. 4,435,932 Alternating V-Truss Roof System and Method of Erection 3/13/84
U.S. No. 4,522,005 Clip Connector for Building Panels having Interlocked Sections 6/11/85

MAJOR TECHNICAL COMMITTEES:

Chairman, ASCE Structures Division Executive Committee
Member, AISI Advisory Group for the Specification for the Design of Cold-Formed Steel Structural Members.
Member, ASCE Committee on Composite Construction
Past Chairman, ASCE Committee on Metals
Member of Planning Committee for '83, '84 and '90 ASCE Structures Congresses
Past Administrative Secretary, ASCE Committee on Metals
Past Chairman, ASCE Committee on Cold-Formed Members

PROFESSIONAL ENGINEER REGISTRATION:

Wisconsin (E9638), Pennsylvania (B168E), Ohio (E-45252)

HONORS: Membership in Chi Epsilon, Tau Beta Pi and Sigma Xi
Engineer of the Year, Waukesha Chapter, WSPE

PROFESSIONAL SOCIETIES:

Member, American Society of Civil Engineers
Member, American Society for Engineering Education
Member, National Society of Professional Engineers
Member, Pennsylvania Society of Professional Engineers

PAUL A. SEABURG

- - PUBLICATIONS - -

Seaburg, P.A. and C.P. Heins, "Torsional Analysis of Rolled Steel Sections", Steel Design File, Bethlehem Steel Corporation, 1963.

Seaburg, P.A. and I. Hooper, "Beam Column Design Aid for Structural Shapes of A36 Steel", Steel Design File, Bethlehem Steel Corporation, 1965.

Seaburg, P.A. and I. Hooper, "Beam Column Design Aid for Structural Shapes of V50 Steel", Steel Design File, Bethlehem Steel Corporation, 1965.

Seaburg, P.A., "Minimum Weight Design of Light Gage Steel Members", PhD Thesis at the University of Wisconsin-Madison, 1969.

Seaburg, P.A., and C.G. Salmon, "Minimum Weight Design of Light Gage Steel Members", Fifth Conference on Electronic Computation, August/September, 1970.

Seaburg, P.A. and C.G. Salmon, "Minimum Weight Design of Light Gage Steel Members", Journal of the Structural Division, ASCE, Volume 9, Number ST1, January, 1971.

Seaburg, P.A., "A Decision Table Formulation of the Specification for the Design of Cold-Formed Steel Structural Members", A report to the American Iron and Steel Institute, July, 1971.

Seaburg, P.A., "A Decision Table Formulation of the Specification for the Design of Cold-Formed Steel Structural Members", Proceedings of the First Specialty Conference on Cold-Formed Structures, August, 1971.

Seaburg, P.A., "Engineering in an Environmentally Concerned Society", UNESCO Regional Office for Science and Technology in the Arab States Bulletin, April-June, 1978.

Seaburg, P.A., "Engineering Education on Cold-Formed Steel Design", Proceedings of the Fifth International Specialty Conference on Cold-Formed Steel Structures, November, 1980.

Seaburg, P.A., "The ABC's (and G) of Cold-Formed Steel Design", Civil Engineering, January, 1981.

Seaburg, P.A. and R.W. Lautensleger, "A New Concept of Steel Roof Panel/Truss Purlin Interaction", Preprint of the ASCE Convention, October, 1981.

Seaburg, P.A. and H.D. Acero, "Sociedad y Formacion Ambiental de los Ingenieros", Revista del Convenio Andres Bello, Abril de 1981.

Seaburg, P.A., "Research in Architectural Engineering", Proceedings of the 1987 Annual Conference, ASEE, June, 1987.

Seaburg, P.A., "Architectural Engineering - An Emerging Specialty Education", Proceedings of the 1988 Annual Convention, ASEE, June, 1988.

Seaburg, P.A., "Computer Aids for the Design of Cold-Formed Steel Structural Members", Proceedings of the Ninth International Specialty Conference on Cold-Formed Steel Structures, November, 1988.

Edited the following publications:

Seaburg, P.A., "Tornado Conference", University of Wisconsin-Extension, April 26-28, 1970.

Seaburg, P.A. and V.M. Bacon, "Proceedings from Deep Tunnels in Hard Rock", College of Applied Science and Engineering, University of Wisconsin-Milwaukee, November 9-10, 1970.

The following reports were prepared for internal use only.

Seaburg, P.A., "Corrugated Roofing and Siding Products", Research Department, Bethlehem Steel Company, August, 1960.

Seaburg, P.A., "Preliminary Roof Deck Study", Research Department, Bethlehem Steel Company, September 13, 1962.

Seaburg, P.A., "Composite Slabform: First Progress Report", Research Department, Bethlehem Steel Company, December, 1963.

Heins Jr., C.P. and P.A. Seaburg, "Analysis of Structural Sections Subjected to Torsional Loading", Product Engineering, Bethlehem Steel Company, January, 1964.

Seaburg, P.A., "Gypsum Form: Modified Slabform for Poured Gypsum Roofs", Homer Research Laboratories, Bethlehem Steel Corporation, June, 1964.

Seaburg, P.A., "Composite Slabform: Second Progress Report", Research Department, Bethlehem Steel Company, July, 1964.

Seaburg, P.A., "Final Manuscript for Bethlehem Steel Design File: Beam-Column Tables for Structural Shapes of V50 Steel", Homer Research Laboratories, Bethlehem Steel Corporation, February, 1965.

Seaburg, P.A. and S.C. Fan, "Bridgform: Load Tests of Bridgform Sheets and Proposed Tension Flange Support System", Homer Research Laboratories, Bethlehem Steel Corporation, March 1965.

Seaburg, P.A., "Steel and Urethane Foam Sandwich Panels in Metal Curtain Wall Construction", Homer Research Laboratories, Bethlehem Steel Corporation, September, 1965.

Seaburg, P.A. and T.J. Weiler, "Static Load Tests of Composite Beams with Hi-Bond and Lightweight Concrete - Series II", Engineering and Product Development Department, Inland Steel Products Company, October, 1966

Seaburg, P.A., "Static Load Tests of Composite Beams with Hi-Bond and Lightweight Concrete - Final Report", Engineering and Product Development Department, Inland Steel Products Company, December,

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RESUME
DAVID W. FOWLER
DEAN T. U. TAYLOR PROFESSOR IN ENGINEERING

David W. Fowler received his B.S. and M.S. in Architectural Engineering at The University of Texas at Austin in 1960 and 1962. He received his Ph.D. in Civil Engineering at The University of Colorado (Boulder) in 1965. He returned to teach at The University of Texas at Austin in 1964 and has continued to teach there until the present time. He is currently a professor in the Department of Civil Engineering. He has completed the supervision of 73 M.S. and 9 Ph.D. degrees. He has received over \$4 million in research grants and contracts.

Dr. Fowler has been active in research in concrete-polymer materials since 1969. He has been a principal investigator on concrete polymer research projects for the Texas Department of Highways and Public Transportation, U. S. Army Corps of Engineers, U. S. Air Force, National Science Foundation, Quaker Oats Company, Dow Chemical Company, and Rohm and Haas Company. Research for Texas DHPT has resulted in the development of a surface impregnation process for highway bridges and pavements, polymer concrete repair of bridges and pavements, polymer concrete overlays, and research on post-tensioned polymer-impregnated concrete beams. Research for the U.S. Army Corps of Engineers led to the development of specifications for the impregnation of vertical outlet walls in Dworshak Dam, which was the first notable construction project in the U.S. using polymers in concrete. Research for the U. S. Air Force had the goal of developing polymer concrete for the rapid repair of bomb-damaged runways. A Project funded by NSF investigated the behavior of PIC under biaxial loading. Considerable research has been performed on the use of high molecular weight methacrylate for sealing cracks in bridges and pavements.

The University of Texas has been the leading educational institution in the U.S. and, probably the world, in concrete-polymer materials research with more than 30 M.S. and Ph.D. degrees awarded to students whose research has been in this area. Dr. Fowler and Dr. Donald Paul, chairman of the Department of Chemical Engineering, were cited by Engineering News-Record in 1976 for their contributions in developing the polymer impregnation process for bridges. Dr. Fowler served as chairman of the American Concrete Institute Committee 548, Polymers in Concrete, from 1979 to 1985. Committee 548 is the only national body with the responsibility of gathering and disseminating information on polymers in concrete. He also serves on Committee 546, Repair of Concrete, and Committee 551, Tilt-Up Concrete Construction. In March, 1985 he received the ACI Delmar L. Bloem Award for "major and significant contribution to the knowledge of polymers in concrete." He is listed in "Who's Who in America" and "Who's Who in the World." He was named a Fellow in the American Society of Civil Engineers in 1983 and in the American Concrete Institute in 1984.

Dr. Fowler has been very active in presenting information on his research. He has presented seminars in the U.S. and Mexico, and has made many oral presentations at conferences. He and Dr. Paul served as co-chairmen of the Second International Congress on Polymers in Concrete in Austin in October 1978 and as co-editor of Proceedings. He served on advisory committees to the Third International Congress on Polymers in Concrete held in Japan in May 1981 and the RILEM Symposium on Plastic Materials in Buildings held in Prague in June 1981. Dr. Fowler was the co-author of four papers presented orally and published in the Proceedings of the Third Congress in Japan, and he gave a special lecture at the Congress. He was elected President of the International Congress on Polymers in Concrete in 1981, and reelected in 1984 at the Fourth Congress in Darmstadt, West Germany. Since 1977 he has been a lecturer at The World of Concrete Seminars on Special Concretes, Concrete Repair Materials, and Fiber Concrete. He has presented numerous seminars on repair of concrete to industry and technical societies. He has served as co-editor of Polymer Concrete - Uses, Materials, and Properties, SP-59, American

Concrete Institute (1985) and as editor of Polymer Modified Concrete, SP-99, American Concrete Institute (1987).

Dr. Fowler has been actively involved in wood engineering for many years. He has taught a course in wood engineering since 1964. He has performed research in wood engineering since the 1960's. He was active in the testing and evaluation of several wood components in the HUD-sponsored Austin Oaks Low Cost Housing Project conducted by a UT team in 1968-1970. In 1977, a research program for the Texas Department of Labor and Standards, Manufactured Housing Division, was initiated. This study has been devoted solely to structural design and analysis of mobile homes, primarily shear walls and related connections. Seven reports have been issued to date. Dr. Fowler has served as co-chairman of the Annual Mobile Home/Manufactured Housing Engineering Conferences held at The University of Texas campus. The fifth conference was held in June 1983. Dr. Fowler is also a member of the ASCE Committee on Wood and has served on the Mobile Home Subcommittee of the Building Energy Product Standard Committee of the National Institute of Building Sciences.

Significant research in manufactured housing includes:

1. Connections Used in Mobile Homes (1978-80). Texas Department of Labor and Standards. A large number of tests were performed on typical connections used in mobile homes. These included: Withdrawal loads of lag screws, tapping screws, nails; lateral loads of lag screws, tapping screws, and nails; stapled joints; and adhesive joints: several areas needing improvement in design procedure were found.
2. Mobile Home Shear Wall Tests. Texas Department of Labor and Standards. (1977 - 81). A unique test model was developed which consisted of two 8 ft. longitudinal I-beams, transverse joist, floor sheathing side walls, shear wall, roof trusses and ceiling board. A large number of variables were used in the test program. Many recommendations were made to improve the design of shear walls.
3. Mobile Home Connections and Shear Walls. DHUD 1981-83. A large number of connections used in mobile homes were tested.
4. Comparison of Building Codes. Texas Manufactured Housing Association, 1984. A comparison of four building codes (One and Two Family, HUD Code, UBC and SBC) was made with the objective of determining the differences in code requirements for manufactured housing (mobile and modular) and site-built housing.

Significant research in concrete materials includes:

1. Concrete-Polymer Materials for Highway Applications (1970-78). Texas State Department of Highways and Public Transportation. Developed polymer-impregnation process for bridge decks. Research began with basic concepts and carried through field tests and preparation of specifications. Principal investigators were cited by Engineering-News Record in 1975 for contributions to construction industry for these developments. Polymer concrete (aggregate with polymer binder) was developed for repairing bridge decks. Research included basic studies, practical applications including numerous field demonstrations. A polymer-concrete overlay (1/2-in. thick) was developed for bridges to make them more resistant to intrusion of water and chlorides, and to develop improved skid resistance.
2. Polymer Impregnation of Vertical Surfaces (1974-75). U. S. Corps of Engineers, Walla Walla District. Performed first research on impregnation of vertical surfaces of concrete walls. Research led to first application of polymer impregnation of vertical surfaces of Dworshak Dam in Idaho

3. Test for Breakable Fire Resistant Glass. ASG, Inc. Developed a proposed fire test for breakable fire resistant glass and applied test to various sizes of glass.
4. Permeability Tests of Grouted Brick Masonry Walls (1973). University of Michigan. Tested brick walls made with two levels of workmanship to permeance tests. Some walls were sandblasted, some grouted, and some ungrouted.
5. Determination of Cleaning Procedure on Strength of Brick Masonry (1974-75). State of Wisconsin. Investigated the effect of several cleaning methods on flexural strength and water permeance of brick walls.
6. Tests on Water Tightness of Flexible Sealants (1978-80). K.T. Snyder Company. Tested two types of continuous flexible sealants for water tightness using Bureau of Reclamation test. Based on test results, client was successful in having product used on 8-mile water tunnel project in Utah. Developed a water Tightness test for Synko-flex, a sealant used for cold joints in walls.
7. Rapid Repair of Runways (1979-81). U. S. Air Force. A large (\$250,000) research project to develop rapid repair techniques for bomb-damaged runways using polymer concrete. Study includes basic materials research to field tests.
8. Furan Resin Polymer Concrete (1982-83). Quaker Oats Company. Research is being performed to evaluate a furan resin PC. Tests include compression strength, flexural strength, bond, creep at 75°F and 150°F, shrinkage, freeze-thaw resistance, and bearing.
9. Other Proprietary PC Systems (1983-84). Two chemical companies are funding research to determine mechanical and durability properties essentially odorless, and much less flammable.
10. Structural Tests on Polysil[®] (1983). Hughes Supply, Inc. Tests are beginning on determining the stress at which cracking occurs in Polysil[®] PC which is being used to make the top end of structural transmission poles. Tests will be conducted to determine the bond strength of glass pultrusion rods to PC.
11. Other Related Research. State Department of Highways and Public Transportation. Several projects involving strength and durability of rapid setting materials for repair are underway. One area of the research involves developing screening tests to determine the suitability of these materials for highway applications. Some of the materials are to be used for concrete pavement repair and some for wet asphalt repair.
12. Biaxial Load Behavior of High Strength Concrete. U. S. A.F.O.S.R. (1981-85). Research investigated mortar and aggregate combinations to yield highest strength concrete. Biaxial load tests were conducted. Biaxial tension load tests and cyclic load tests will begin soon.
13. Repair of Cracks and Joints on Concrete Pavements. Texas Department of Highways and Public Transportation (1983-86).
14. Investigation of Polymer Concrete Systems (1984 to present), Texaco Chemical Company, Rohm and Haas, Transpo Industries, Inc..
15. Investigation of Polymer Concrete for Precast Building Components (1984)

16. Investigation of Bonded Concrete Overlays (with B. F. McCullough), (1984 to present) Texas State Department of Highways and Public Transportation.
17. Evaluation of Tensile Strength Testing as a Means of Quality Control, (with A. H. Meyer) Texas State Department of Highways and Public Transportation.
18. Investigation of Behavior and Properties of Polymer Concrete (with D. R. Paul) Texas Advanced Technology Research Program.
19. Other recent significant research projects include:
 1. Design of Rest Area Comfort Stations (with K. Perry, J. F. Malina, G. Vliet) Texas State Department of Highways and Public Transportation.
 2. Strategic Research Plan for Achieving Adequate Pavement Friction (with A. H. Meyer) (1985-1991)

REPORTS AND PUBLICATIONS

"Approximate Solutions for Certain Cylindrical Shell Problems," Ph.D. Dissertation, University of Colorado, Boulder, 1965.

Discussion of "Flexural Tests of Reinforced Concrete Slabs," by Alan Metz, Journal of American Concrete Institute, Vol. 62, No. 9, pp. 1159-1160, 1965.

"Design Criteria for Column Supports for Vertical Pressure Vessels," Report for Humble Oil and Refining Company, Baytown, Texas, 1967.

"Analysis of Pressure Vessels for Yielding and Bursting," Report for Humble Oil and Refining Company, Baytown, Texas, 1967.

Discussion of "Materials for Structural Models," by Frederick Roll (with D. S. Porter), Journal of the Structural Division, American Society of Civil Engineers, Vol. 5, No. ST3, pp. 505-507, 1969.

"New Analysis Method for Pressure Vessel Column Supports," Hydrocarbon Processing, pp. 157-162, 1969.

"Austin Oaks 68," (with F. B. Johnson, J. N. Thompson, R. I. Carr, and J. T. Houston), Proceedings of the International Symposium on Low Cost Housing Problems Related to Urban Renewal and Development, Rolla, Missouri, 1970.

"Design of Laterally Unsupported Timber Beams," Journal of the Structural Division, American Society of Civil Engineers, Vol. 97, No. ST3, March 1971, pp. 881-890.

"HUD Austin Oaks Project: Structural and Materials Performance," (with J. T. Houston), report prepared for the U. S. Department of Housing and Urban Development, Low Income Housing Demonstration Contract No. H-1037, LIHD-2,

Structural Mechanics Research Laboratory and Center for Building Research, The University of Texas at Austin, Vol. II, December 1971.

"Structural Behavior of Wall Panels for Lower-Cost Housing," (with J. T. Houston and F. B. Johnson), Proceedings of the Second International Symposium on Lower-Cost Housing Problems, St. Louis, Missouri, April 1972.

"A Slab Foundation Subjected to Complex Loads," (with J. J. Panak and Hudson Matlock), Journal of the American Concrete Institute, October 1972, No. 10, Vol. 69, pp. 630-637.

"The Analysis of Nonlinear Cable Net Systems and Their Supporting Structures," (with D. S. Porter), paper presented to the National Symposium on Computerized Structural Analysis and Design, Washington, D. C., March 28, 1972, Journal of Computers and Structures, No. 5, Vol. 3, September 1973.

"Impregnation and Evaluation Techniques for Polymer Concrete in Highway Bridge Deck Application," Proceedings of the ACI Symposium on Polymers in Concrete, March 9, 1973 (Publication, December 1973).

"Polymerization of Methyl Methacrylate by Catalyzed Peroxide Decomposition without Applied Heat," (with D. R. Paul and J. T. Houston), Journal of Applied Polymer Science, Vol. 17, pp. 2771-2782, 1973.

"Polymer-Impregnated Concrete for Highway Application," (with J. T. Houston and D. R. Paul), Report 114-1, Center for Highway Research, The University of Texas at Austin, February 1973.

"Need for Breakable Fire Resistant Glass," (with C. T. Grimm), Report to Texas State Building Materials and Systems Testing Laboratory, Austin, Texas, August 17, 1973.

"Permeability Tests of Grouted Brick Masonry Walls," Report for The University of Michigan, Structural Mechanics Research Laboratory, August 15, 1973.

"To Develop and Organize the Essential Characteristics of the Laboratory Examining Agency," (R. W. Furlong), Report to Project LEAP, National Bureau of Standards, January 1973, 70 pp.

"Corrosion Protection of Reinforcing Steel Provided by Polymer-Impregnated Concrete," (with D. R. Paul and P. Yimprasert), Research Report 114-2, Center for Highway Research, The University of Texas at Austin, September 1973.

"Assessment of the Character and Trends of Housing Technology and Industrialized Building of Housing in the U. S.," (with J. N. Thompson, et al.), Report for the Center for Building Research, The University of Texas at Austin, September 1973.

"Investigation of Polymer-Impregnated Brick Masonry," (with T. J. Fraley), Journal of the Structural Division, American Society of Civil Engineers, January 1974.

"Design of Prestressed Cable Truss Structures," (with Dwight Urelus), Journal of the Structural Division, American Society of Civil Engineers, August 1974.

"Concrete-Polymer Materials Development in the U. S.," (with G. W. DePuy), Proceedings of the First Australian Conference on Engineering Materials, August 1974.

"Test for Breakable Fire-Resistant Glass," (with C. T. Grimm), Report for Texas State Building Materials and Systems Testing Laboratory, August 22, 1974.

"Effects of Sand Blasting and Face Grouting on Water Permeance of Brick Masonry," Proceedings of a Symposium on Masonry: Past and Present, American Society of Testing Materials, August 1975.

"Repair of Concrete with Polymers," (with M. M. Jaber and D. R. Paul), Research Report 114-3, Center for Highway Research, The University of Texas at Austin, February 1975.

"Determination of Cleaning Procedure on Strength of Brick Masonry," Research Report, Center for Building Research, The University of Texas at Austin, February 28, 1975.

"Results of Teaching ArE 362L by the Keller Method," Research Reports, Department of Civil Engineering, The University of Texas at Austin, February 28, 1975.

"Design of Structural Systems in Timber," one of a series of reports on the project entitled Expansion of Keller Plan Instruction in Engineering and Selected Other Disciplines, The University of Texas at Austin, November 1975.

"Surface Impregnation of Concrete Bridge Decks with Polymers," (with D. R. Paul), Journal of Applied Polymer Science, Vol. 19, pp. 281-301, 1975.

"Partial Impregnation of Highway Bridge Decks," (with D. R. Paul), Transportation Research Record, No. 542, 1975, pp. 9-19.

"Breakable Fire-Resistant Glass Performance Criteria," (with C. T. Grimm), Fire Technology, May 1976.

"Polymer-Impregnated Concrete for Highway Applications," 13th Paving Conference, Proceedings of the University of New Mexico, Albuquerque, New Mexico.

"Partial Polymer-Impregnation of Center Point Road Bridge," Research Report 114-5, Center for Highway Research, The University of Texas at Austin, January 1976, (with Ron Webster and Donald Paul).

"Durability Strength and Method of Application of Polymer-Impregnated Concrete for Slabs," Research Report 114-4, Center for Highway Research, The University of Texas at Austin, January 1976, (with P. Yimprasert and D. R. Paul).

"Polymer-Impregnation Used in Concrete Repairs of Cavitation/Erosion Damage," (with E. K. Schrader, R. Stebbins, and R. A. Kaden), Proceedings of a Symposium on Polymers in Concrete, SP-58, 1978, pp. 225-248.

"Strength and Behavior of Reinforced Polymer-Impregnated Concrete Beams," (with P. Phinyawat, E. Limsuwan, and D. R. Paul), in the Proceedings of a Symposium on Polymers in Concrete, SP-58, 1978, pp. 187-204.

"Bridge Deck Impregnation in Texas," (with R. P. Webster and D. R. Paul), Proceedings of a Symposium on Polymers in Concrete, SP-58, 1978.

"Safety Aspects of Concrete-Polymer Materials," (with L. Kukacka, D. R. Paul, E. Schrader, and W. G. Smoak), Proceedings of a Symposium on Polymers in Concrete, SP-58, 1978, pp. 123-138.

"Corrosion Protection of Reinforcing Provided by Polymer-Impregnated Concrete," (with D. R. Paul and P. Yimprasert), Journal of the American Concrete Institute, October 1978.

"Polymers in Concrete for Repair of Bridge Decks," (with D. R. Paul), Proceedings of the Second International Congress on Polymers in Concrete, Austin, October 25-27, 1978, pp. 337-350.

"Flexural Behavior of Post-Tensioned Polymer-Impregnated Concrete Beams," (with D. R. Paul and N. H. Burns), Proceedings of the Second International Congress on Polymers in Concrete, Austin, October 25-27, 1978, pp. 361-380.

"Use of Sulfur to Repair Damaged Concrete," Proceedings of the Second International Congress on Polymers in Concrete, Austin, October 25-27, 1978 pp. 381-398.

"Current Status of Bridge Deck Impregnation," (with J. Bartholomew and D. R. Paul), Proceedings of the Second International Congress on Polymers in Concrete, Austin, October 25-27, 1978, pp. 399-412.

"Differential Movement in Composite Load-Bearing Masonry Walls," (with C. T. Grimm), Journal of the Structural Division, ASCE, July 1979.

"An Investigation of Mobile Home Shear Wall Sole Plate Mechanical Connectors," (with C. Keaton), Report MH-1 for Manufactured Housing Division, Department of Labor and Standards, IAC (78-79) 1054, Department of Civil Engineering, The University of Texas at Austin, Feb. 1979.

"A Computerized Method for the Structural Analysis of Mobile Homes Under Static Loading," (with H. Elias), Report MH-2 for Manufactured Housing Division, Department of Labor and Standards, IAC (78-79) 1054, Department of Civil Engineering, The University of Texas at Austin, December 1979.

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GRADUATE SCHOOL SUBCOMMITTEE REPORT ON THE PROPOSED
MASTER OF SCIENCE IN ARCHITECTURAL ENGINEERING

Summary of Procedure

In January 1989, the department of Civil and Architectural Engineering submitted a proposal for a Master of Science in Architectural Engineering to the Graduate School. The proposed degree had already been endorsed by the College of Engineering.

The proposal was submitted to a Graduate School faculty review committee consisting of Drs. Jose Gelabert-Navia, Tarek Khalil, Fred Nagle, and Donald Olson, and to the external reviewers, Dr. David Fowler, University of Texas at Austin, and Dr. Paul Seaburg, Pennsylvania State.

After a two-day visit in May, the external reviewers chose to submit a joint report of approval and recommendations which they said could be used as a public document. Dr. Phang, Chairman of the Department of Civil and Architectural Engineering, provided written responses to the suggestions.

The faculty review subcommittee then met and decided to strongly recommend the approval of this degree to the Graduate Council.



SUMMARY OF PROPOSAL FOR
MASTER OF SCIENCE IN ARCHITECTURAL ENGINEERING

Rationale

There is a growing demand for graduate students trained in Architectural Engineering by the building industry, government, and educational institutions. Currently there are only 12 accredited undergraduate programs in Architectural Engineering. (Accreditation applies only for undergraduate programs, and the program at the University of Miami is accredited.) Only six of these schools currently offer graduate degrees. No graduate degree in Architectural Engineering is offered in the Southeast. The demand for such programs is evidenced by the significant increase in undergraduate Architectural Engineering majors in recent years. They currently outnumber the number of Civil Engineering majors at the University of Miami. Many of these students are interested in continuing their training. In addition, industry is demanding graduates with more expertise than can be gained from earning an undergraduate degree.

The students in the proposed Master of Science in Architectural Engineering will receive interdisciplinary training in analysis and design of buildings, building materials, building services, environmental systems of buildings (heating, ventilation, and air conditioning, HVAC), and integrated building systems. To quote the proposal: "Graduate students will produce valuable research which will help to narrow the communication gap between architects and engineers, as well as between engineers of different fields who must work together in the design and structure of buildings."

There is a strong local need in the building area for expertise in such individual areas. The proposal calls for a first-year enrollment of 10 students. Within three years the total enrollment is projected at 23 students per year. There seems to be an adequate pool of students to warrant this projection.

Curriculum

The curriculum is carefully designed. Students may opt for a 30-credit thesis option or a 36-credit non-thesis option. Most students will be encouraged to pursue the thesis option. The Master's degree should be completed within two years. Course scheduling for the first three years was provided in the proposal and indicates that adequate offerings will be provided.

The curriculum provides that minimums of 6 credits in integrated building systems and 9 credits in environmental control must be taken by each student. These areas are well chosen since there is a public demand for expertise in these areas and current faculty expertise exists already at the University. Six new courses will be offered in the Department of Civil and Architectural Engineering. (Syllabi were included in the

proposal). In addition, students will take courses in Architecture, Mechanical, or Electrical Engineering. Letters of support from the School of Architecture and the departments of Mechanical and Industrial Engineering were also included in the report. Sample tracks of study for students were also provided. Both the faculty review committee and the external reviewers felt the proposed curriculum is sound.

Faculty

There is adequate faculty to initiate this program. However, additional faculty will be required by the third year when enrollment reaches its steady state. There is provision for hiring one additional faculty in the third year. During the first two years a modest number of courses will be taught by adjuncts. Brief vitae for these adjuncts were provided. The external reviewers felt that the adjuncts will be satisfactory for the first few years but should be used primarily to teach undergraduates, freeing the permanent faculty for new graduate courses. The faculty review committee concurs that adjuncts should have academic credentials commensurate with their participation in the program.

The faculty committee and outside reviewers felt the program could begin with the current faculty, but at least one additional faculty member must be hired the third year. The faculty to be involved are enthusiastic and highly qualified. The department should consider the balance between this program and civil engineering. Dependent on the success of this program, the department may desire to shift the faculty toward this specialty.

Physical Facilities and Research

The faculty review committee and the external reviewers visited the facilities. These will be adequate to support the program at the proposed size, especially when the new engineering building is complete. The computer facility has been recently upgraded and is good. The external reviewers felt laboratory space and equipment for structural research should be increased as the program grows. Money has been budgeted for this. Adequate space is also available for student offices.

Growth in research activities to provide both problems for theses and infrastructure in terms of equipment and technical staff should be emphasized. Research funding should provide a sizeable portion of the technical costs associated with the graduate program.

Budget

A three-year budget is presented which seems fiscally sound and reasonable. There is allowance for hiring faculty during the

third year. There is provision for three teaching assistants each year once the program is at full enrollment. Appropriate funds have been allocated for publications and advertising.

Comparisons

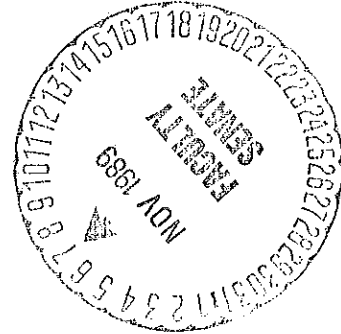
The proposal provided comparisons with existing programs at the University of Texas at Austin and the University of Colorado at Boulder. These schools offer specialties similar to those proposed at the University of Miami. The program proposed at Miami compares well.

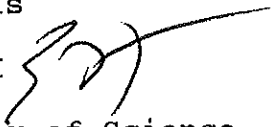


M E M O R A N D U M

Edward T. Foote II
President

November 2, 1989



TO: George Alexandrakis
FROM: Edward T. Foote II 
SUBJECT: Proposal for Master of Science
in Architectural Engineering

We have a problem, I am told.

Before me sits a stack of paper concerning a proposal for a new Master of Science in Architectural Engineering. It has been approved by many, including external consultants, the graduate faculty, the Graduate Council and the provost.

Under our relatively new procedures, it would now go to the Faculty Senate, which replaced the Academic Planning Committee as the ultimate faculty review body.

The problem is that apparently this new procedure was not adopted in accordance with the Faculty Manual, which required that such a change in procedure be approved by the board, which was not done.

Another problem is the extraordinary length of time that such a reviewing process can take. You are aware of some of the examples I have in mind.

The question is not whether academic programs should be fully and carefully reviewed by the faculty. The answer to that question is clearly yes. The question is rather what is the best form of such a review. Equally clearly, we do not now have one.

This proposed program should be fully approved in time to be in place next fall. The Faculty Manual allows for the graduate faculty to make recommendations directly to the provost without the review of the Senate. We need to move quickly. What is your advice?

George Alexandrakis

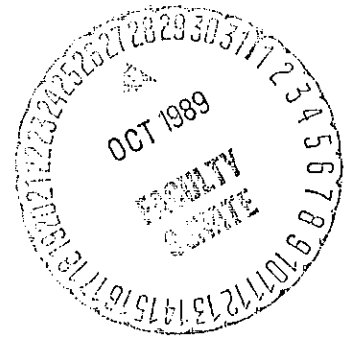
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November 2, 1989

This is only one issue in a much broader concern that I share with many throughout the University. The concern is that we take far too long to consider and approve--or reject--proposed academic programs. We cannot afford that luxury in so challenging a period. I ask that this subject be thoroughly reviewed in the coming weeks. Thanks.

ETF:LLS

cc: Luis Glaser
Paul Dee



Edward T. Foote II
President

MEMORANDUM

October 25, 1989
(Dictated October 20, 1989)

TO: George Alexandrakis
FROM: Edward T. Foote II *EF*
SUBJECT: Proposal for Master of Science
in Architectural Engineering

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Under our relatively new procedures, it would now go to the Faculty Senate, which replaced the Academic Planning Committee as the ultimate faculty review body.

The problem is that apparently this new procedure was not adopted in accordance with the Faculty Manual, which required that such a change in procedure be approved by the board, which was not done.

Another problem is the extraordinary length of time that such a reviewing process can take. You are aware of some of the examples I have in mind.

The question is not whether academic programs should be fully and carefully reviewed by the faculty. The answer to that question is clearly yes. The question is rather what is the best form of such a review. Equally clearly, we do not now have one.

This proposed program should be fully approved in time to be in place next fall. The Faculty Manual allows for the graduate faculty to make recommendations directly to the provost without the review of the Senate. We need to move quickly. What is your advice?

George Alexandrakis

-2-

October 25, 1989

This is only one issue in a much broader concern that I share with many throughout the University. The concern is that we take far too long to consider and approve--or reject--proposed academic programs. We cannot afford that luxury in so challenging a period. I ask that this subject be thoroughly reviewed in the coming weeks. Thanks.

ETF:LLS

cc: Luis Glaser
Paul Dee

FILE COPY

TO: President Edward T. Foote II

FROM: George C. Alexandrakis
Chairman, Faculty Senate

DATE: November 2, 1989

RE: Proposal for Master of Science in Architectural Engineering
(Your memo of October 25, Dictated October 20, 1989)

Your memo raises a number of issues. I will try to respond to each of them.

First, let me state that the deadline for every proposal that has come to the Faculty Senate in the last five or more years has been met. Moreover, every proposal was considerably improved in the process, through collaboration with the schools and departments involved. Sometimes we had to schedule additional meetings to accomplish our task but we did so. The Faculty Senate, therefore, has discharged its duty in a timely and responsible fashion.

The Process at the APC-Senate level has been shortened considerably by combining the two bodies. This arrangement was arrived at by Administration and Faculty Senate agreement and is contained in legislation 86001(A),(B) which you have signed. (The 86001(A) part of the legislation has not received final approval by the Faculty and the Trustees as yet. As you know, approval of (A) legislation is costly, since it involves Faculty-wide ballot. Traditionally, (A) legislation has been collected for couple of years and then submitted for a faculty vote. This piece has been held somewhat longer than usual because we have been waiting for approval of the (A) legislation associated with the bylaw on promotion and tenure.)

I believe the restructured APC-Senate process is logical and efficient and it can meet all reasonable deadlines for program approvals. In any case, in its efforts to further improve its efficiency and communication with other Faculty bodies, the Senate Council invited the Graduate Council last Spring, (March 23), to work together "to explore ways of streamlining the approval process for new graduate programs." As of this date we have not received any response to our invitation.

As for the Proposal of Master of Science in Architectural Engineering, you will recall that you mentioned to me some of the issues included in your October 20 memo on the morning of October 20 as we were driving back from the Academic Affairs Committee meeting. We agreed that I would look into the matter and discuss the procedural side with Paul Dee. Upon returning to the office I called Paul and we agreed to meet as soon as he returned from a pending University business trip. We did meet, in fact, on October 31 and he will report to you separately on our discussions. This proposal, I discovered, had never been submitted to the Senate for consideration. Last February we received a copy of a letter from

President Edward T. Foote II
November 2, 1989
Page 2

the Dean of the Graduate School to the Department of Civil and Architectural Engineering informing them that the proposal had been sent to a Graduate School subcommittee and asking for additional information. We waited for the final draft to arrive but we received no further notice of the program or its progress. In the summer we became concerned and, according to our records, the Senate office contacted the Department of Civil and Architectural Engineering and indicated that we were anxious to receive the proposal and move it forward. Dr. Phang had indicated that when the issues were resolved by the Graduate School we would receive the proposal. We have still not received a copy of the final draft of the proposal or a request that it be considered. I hope you will agree that we cannot be blamed for delaying a proposal we were never asked to consider.

Now on the constitutional issue you raise: the powers granted to the Graduate Faculty in Section III 3.4 of the Charter are explicitly "subject . . . to the authority of the Senate to determine policies . . . which are necessary for the coordination of the various schools and, except when specifically delegated to the faculty, are subject also to the authority of the President." For as long as anyone can remember all new graduate programs have been submitted to and approved by the Senate. Although I am not a constitutional expert it is clear to me why this is so: many graduate programs are based on or build on existing undergraduate programs and they may affect programs in other schools or involve more than one school. It is, therefore, the responsibility of the Senate and the President "to determine policies . . . which are necessary for the coordination of various schools." I therefore believe that this process is correct and in accordance with the Faculty Manual, and it has been honored by at least two Presidents, you and your immediate predecessor.

What is my advice to you? I appreciate very much your asking. Here are my thoughts:

- (a) If the proposal is a good one, there should be no problem in getting it approved by the Senate in time for it to be in place by next fall.
- (b) Speeding up the approval process in general requires accelerations outside the Senate.
- (c) You know how much I respect and appreciate the leadership you have displayed and encouraged in this University. In that spirit, I would like to ask you to help maintain the cooperation that has enabled us to come so far towards achieving many of our important goals. I will be very happy to discuss further with you this and related matters at your convenience.

cc Provost Glaser
Mr. Paul Dee



Edward T. Foote II
President

MEMORANDUM

October 25, 1989
(Dictated October 20, 1989)

TO: George Alexandrakis
FROM: Edward T. Foote II *EF*
SUBJECT: Proposal for Master of Science
in Architectural Engineering

We have a problem, I am told.

Before me sits a stack of paper concerning a proposal for a new Master of Science in Architectural Engineering. It has been approved by many, including external consultants, the graduate faculty, the Graduate Council and the provost.

Under our relatively new procedures, it would now go to the Faculty Senate, which replaced the Academic Planning Committee as the ultimate faculty review body.

The problem is that apparently this new procedure was not adopted in accordance with the Faculty Manual, which required that such a change in procedure be approved by the board, which was not done.

Another problem is the extraordinary length of time that such a reviewing process can take. You are aware of some of the examples I have in mind.

The question is not whether academic programs should be fully and carefully reviewed by the faculty. The answer to that question is clearly yes. The question is rather what is the best form of such a review. Equally clearly, we do not now have one.

This proposed program should be fully approved in time to be in place next fall. The Faculty Manual allows for the graduate faculty to make recommendations directly to the provost without the review of the Senate. We need to move quickly. What is your advice?

George Alexandrakis

-2-

October 25, 1989

This is only one issue in a much broader concern that I share with many throughout the University. The concern is that we take far too long to consider and approve--or reject--proposed academic programs. We cannot afford that luxury in so challenging a period. I ask that this subject be thoroughly reviewed in the coming weeks. Thanks.

ETF:LLS

cc: Luis Glaser
Paul Dee