Committee on Minorities in Engineering (1976)

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PURPOSES

Fewer than three percent of the nation's 1.2 million practicing engineers are either Black, Mexican American (Chicano), Puerto Rican, or American Indian. These four minorities, by contrast, represent about 17 percent of the total population.

Engineering is often a pathway profession to leadership in corporate management, industrial research, education, and government. As the trend toward more engineers moving into executive positions has accelerated in recent years, the ethnic and racial minorities that have been historically underrepresented in engineering are not sharing in the action. These minorities must have the opportunities to pursue engineering careers and compete for positions in industry, education, and government. In doing so, they can bring the experiences and needs of their cultures to technology.

In the late 1960's a few universities took the lead in lifting the educational, financial, and cultural barriers to minority participation in engineering. Special programs for minority students were started on a number of engineering college campuses. While these special programs were a start, the need to attain a fair representation for minorities in the engineering profession over a reasonable period of time was still far from being met.

Responding to this problem, the National Academy of Engineering (NAE) conducted a two-day symposium in Washington, D.C., during May 1973, when 250 engineers, educators, and university and industrial leaders gathered to discuss various approaches to the recruitment, training, and financial support of minority students in engineering. One unanimous conclusion was the setting of a target of a tenfold increase

in the nation's minority engineers within a decade by raising the annual number of graduates in the field from 500 to 5,000. This was considered a reasonable goal, provided the necessary resources could be marshalled at national and local levels.

The participants also called for the NAE to establish a committee to explore with concerned representatives of industry, education, and government how to deal with issues raised at the symposium.

In February 1974, largely at the initiative of Robert C. Seamans, Jr., then president of the NAE, the National Advisory Council on Minorities in Engineering held its first meeting. Made up of the chief executives of some of the nation's leading corporations, universities, engineering societies, and minority organizations, together with federal officials at cabinet and subcabinet levels, it was designed from the start to help activate the resources that would be needed to achieve the goal of a tenfold increase in minority engineering graduates.

The Committee on Minorities in Engineering was established in April 1974 for the purpose of coordinating efforts to increase minority participation in engineering by:

- Defining needs, identifying resources, and recommending activities that seek to stimulate and develop program opportunities;
- Developing generic models of successful approaches;
- Advising and encouraging interactions among appropriate groups;
- Serving as a resource center or forum for related activities; and
- Communicating and disseminating data, information, and studies.

The committee most often works on the decision-making level with interested organizations, institutions, and groups that set goals, initiate proposals, allocate resources, and influence other efforts to increase minority representation in engineering. Priority is usually given to those activities that hold promise of becoming an integral part of existing educational structures or other institutional systems.

In addition, the committee provides workshops, conferences, meetings, and task forces in which problem holders are brought together with problem solvers. By examining specific questions, the participants in such activities help devise workable solutions for overcoming the barriers facing minority students who seek to enroll in engineering schools, to maintain their course of study, and to finance their degrees.

Through its work, as part of the Assembly of Engineering in the National Research Council, the committee serves as a catalyst for a community of interests concerned with mobilizing students from four minority groups — Black, Mexican American (Chicano), Puerto Rican, and American Indian — into the engineering profession.

ORGANIZATION

The planning, implementation, and evaluation of activities is carried out through: (1) the National Advisory Council on Minorities in Engineering (NACME), (2) the Committee on Minorities in Engineering (CME), (3) subcommittees on Pre-Engineering Education, Guidance, and Motivation; Engineering Education; Manpower Utilization; and Finance, (4) task forces, and (5) the committee staff.

NATIONAL ADVISORY COUNCIL ON MINORITIES IN ENGINEERING (NACME)

Formed at the invitation of the President of the National Academy of Engineering, NACME consists of the chief executives of some of the nation's major corporations, universities, engineering societies, and minority organizations, together with the principal officials of several federal government departments. Meeting semi-annually, the council was organized to mobilize the resources from industry, government, minority and professional organizations, and the educational community and to advise the NAE President and the Chairman of the Assembly of Engineering on minority engineering activities. Through its industrial members, NACME provides financial support for the committee. (See membership list on page 15.)

COMMITTEE ON MINORITIES IN ENGINEERING (CME)

This committee is made up of representatives from industry, education, minority organizations, industrial associations, professional

societies, and government. It meets twice annually to establish policies, initiate activities, and evaluate programs. While the committee encourages and stimulates activities at national and local levels, it does not supplant or preempt the work of others concerned with a similar mission.

SUBCOMMITTEES

Four subcommittees concentrate on major elements considered necessary for achieving national minority engineering targets for enrollment and graduation. Members are drawn from institutions and organizations involved in minority engineering activities. This expertise is useful in developing policy recommendations, designing programs, and evaluating specific aspects of the CME program.

Subcommittee on Pre-Engineering Education, Guidance, and Motivation

This subcommittee focuses on increasing the pool of motivated and prepared minority students interested in an engineering career. Its work includes examining the role of teachers, counselors, and others who can assist in the process. Accordingly, the subcommittee is charged with:

- Establishing liaison with educational, professional, governmental, minority, and other organizations involved in pre-college efforts and encouraging communication between such groups;
- Collecting information and conducting studies on motivating and preparing pre-college minority students; and
- Assisting organizations to improve or initiate programs aimed at increasing the pool of minority students.

Subcommittee on Engineering Education

This subcommittee encourages supportive programs in engineering schools and other post-secondary institutions where minority students are preparing to transfer into an engineering curriculum. Its activities include:

- Identifying the components of academic and supportive programs;
- Collecting information on existing policies and programs providing support services;
- Conducting studies related to college level programs and support services;
- Holding workshops to exchange information on engineering school activities for minority students; and
- Stimulating interaction between engineering schools and those post-secondary institutions enrolling potential minority engineering students.

Subcommittee on Manpower Utilization

This unit is devoted to increasing employment opportunities for minority engineering students and graduates. Its concerns cover career mobility of minority engineers, their role in furthering minority engineering

efforts, and co-op programs and summer jobs. The subcommittee engages in:

- Collecting information on future needs;
- Identifying employment opportunities;
- Collecting and analyzing information on co-op programs, summer employment opportunities, and work-study programs;
- Encouraging the participation of professional engineers in minority engineering programs; and
- Conducting studies related to minority engineering manpower policies, resources, and activities.

Subcommittee on Finance

This subcommittee evaluates the financial needs of minority engineering programs and students. It does not engage in direct fundraising, nor is it a funding source for activities. It is mainly a source of data and a vehicle for fostering funding opportunities. Activities of this unit include:

- Defining the aggregate financial needs of students, organizations, and institutions to meet minority engineering enrollment and graduation targets;
- Collecting information on sources of funding for programs and students;
- Encouraging increased participation of industry, foundations, government, and others;
- Facilitating the creation of funding operations; and
- Conducting studies related to minority engineering funding needs and resources.

TASK FORCES

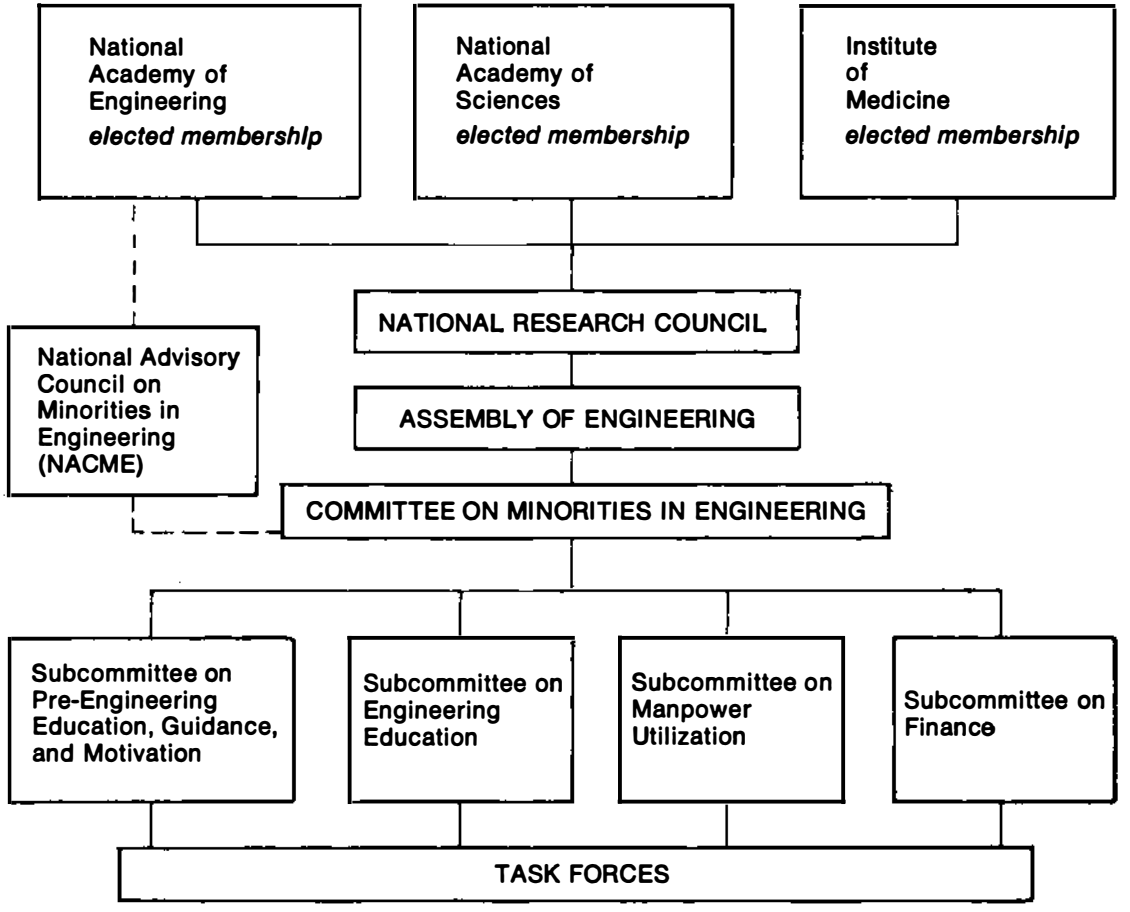
These are created from time to time by the CME to study in detail specific minority engineering issues prior to committee action. Accordingly, there have been task forces dealing with retention and public relations. Other task forces focus on opportunities that cut across subcommittee lines or on broad issues related to minority engineering programs. Thus, task forces have worked on American Indian and Puerto Rican participation in engineering and government involvement in minority engineering activities. Other task forces are cited on page 10.

STAFF

Responsible to the chairman of the committee and the executive director of the Assembly of Engineering, CME's executive director is charged with general management of the committee program and supervision of a staff which includes a deputy director, an educational specialist, a manpower specialist, and a program analyst.

NATIONAL ACADEMY OF SCIENCES

Corporate Entity



OPERATIONS

The CME performs its duties in accordance with a program plan and priorities approved by the committee. Activities may be generated by: (a) specific request from committee members; (b) requests from subcommittees; (c) requests from organizations, agencies, and institutions with an interest in minority engineering activities; and (d) decisions of the committee.

Typically, each committee activity originates with a concept paper outlining the objectives, rationale, processes, and desired outcomes. It is implemented by either the staff or a task force organized specifically for that purpose. Task force members, selected for competence and balance in appropriate specialties, refine the concept paper and develop a detailed work plan.

Most task force activities result in position papers, formal reports, or workshops. Each formal report issued by the CME is submitted to the Report Review Committee, consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine — the three organizations that operate the National Research Council. Upon approval, the report is published and disseminated.

PROGRAM ACTIVITIES

Since its inception, the CME has:

- Established a master plan for achieving parity representation by minorities in the engineering class of 1985-86;
- Created the National Fund for Minority Engineering Students;
- Conducted a Minority Engineering

Program Managers' Workshop in Washington, D. C., June 12-14, 1975;

- Convened representatives of donor organizations to exchange information, discuss priorities, and identify needs;
- Advised engineering schools, consortia, minority organizations, industry, government agencies, educational and professional societies, and others on various phases of the minority engineering effort;
- Completed a study of minority programs at engineering schools;
- Stimulated local/regional coordination of minority engineering activities;
- Collected data, information, program descriptions, studies, and other materials on minority engineering activities, and
- Published *Newsletters* to disseminate information on minority engineering efforts.

At present, task forces have been initiated to pursue:

- The role of mathematics and science teachers in fostering the minority engineering effort;
- Curriculum innovations to motivate and prepare minority students in secondary schools for an engineering education;
- Methods for retaining minority students in engineering schools;
- Career development of minority engineering graduates;
- Supplementary activities such as summer programs, co-op, and others;
- The evaluation of motivational techniques and instruments, and
- Mexican American (Chicano) participation in engineering.

PUBLICATIONS

- Building Effective Minority Programs in Engineering Education.
- A Selected, Annotated Bibliography on Employment of Minority Engineers.
- Proceedings. Workshop on Minority Engineering Programs.

COMMITTEE HISTORY

At a symposium on "Increasing Minority Participation in Engineering" held by the NAE in Washington, D. C., May 6-8, 1973, some 250 engineers, educators, university and industrial representatives, and minority leaders agreed unanimously to establish a national goal of achieving a ten-fold increase in minority engineers within a decade. During the final plenary session, two implementing recommendations were adopted:

1. That the National Academy of Engineering establish a Standing Committee on Minorities in Engineering composed of a cross section of Symposium delegates to include engineering educators, members of minority groups and representatives of industry, and professional/technical organizations.
2. That the National Academy of Engineering take the initiative in exploring with industry, government and educators the feasibility of creating a National Council on Minorities in Engineering.

In early January 1974, a steering committee met to determine the initial goals of a committee program, and on February 13, 1974, the National Advisory Council on Minorities in Engineering (NACME) was formed. Reginald H. Jones, chairman of the board and chief executive officer of the General Electric Company, chaired the Council, which endorsed the goal of achieving a ten-fold increase in minority engineering graduates in the next decade. NACME directed the establishment of the Committee on Minorities in Engineering

(CME) and named Richard J. Grosh, President of Rensselaer Polytechnic Institute as chairman.

Under Dr. Grosh and Vice-Chairman Arthur G. Hansen, President of Purdue University, the committee held its first meeting April 29, 1974. The efforts of the committee were recognized in December 1974 in a report prepared by the Planning Commission for Expanding Minority Opportunities in Engineering, *Minorities In Engineering: A Blueprint for Action,* which made the following recommendation:

> The Task Force recommends that the National Academy of Engineering (NAE) assume a leadership role in coordinating the efforts of the many organizations working to increase minorities in engineering and in stimulating development of new programs that may be needed nationally. Without surrendering their independent prerogatives, these interested organizations should participate in the coordination effort and cooperate fully with each other, discussing their current activities and future plans so that other participants can factor these actions into their own plans and carry out a cohesive national effort.

On July 1, 1974, the CME was transferred from the NAE to the newly formed Assembly of Engineering in the reorganized National Research Council.

Reviewing the committee's activities before the National Advisory Council on Minorities in Engineering on February 6, 1975, Dr. Hansen, who assumed the chairmanship of the Committee for its second phase of activities, noted that in its first year the committee had:

- Attracted a commitment to minority engineering goals and programs from the highest levels of education, industry, government, and minority organizations;
- Assisted in fostering programs and activities to stimulate an increase in the flow of minority students into engineering schools, and
- Provided a focal point for exchanging information, providing advice, and offering assistance to those organizations and institutions participating in the minority engineering effort.

NATIONAL ACADEMY OF SCIENCES
NATIONAL ACADEMY OF ENGINEERING
INSTITUTE OF MEDICINE

The National Academy of Sciences is a self-governing organization of scientists and engineers elected for life on the basis of their outstanding contributions to knowledge. Supported by private and public funds, the Academy works to further science and its use for the general welfare. The Academy is also called upon to act as an unbiased, independent advisor to the federal government for any issue relating to science and technology. It was created by an Act of Incorporation passed by the Congress and signed by President Lincoln on March 3, 1863.

In 1964 the Council of the NAS brought into being, within its charter, a parallel body, the National Academy of Engineering. Similarly, in 1971 the Institute of Medicine was organized. By 1975 the memberships of the NAS totaled 1,134, the NAE 585, and the IOM 306.

The National Research Council was formed in 1916 in response to increasing demands upon the advisory services of the NAS and at the specific request of President Wilson. The Council, the working agency of the entire Academy complex, conducts its studies through the volunteer services of concerned members of the NAS, NAE, and IOM competent to deal with the issues under consideration, supplemented by appropriate outside experts.

The principal functional units of the NRC are the four assemblies and four commissions. Each is overseen by an executive committee of distinguished scientists, engineers, and other specialists. The Assembly of Engineering, which houses the Committee on Minorities in Engineering, is chaired by the president of the NAE, Courtland D. Perkins.

CURRENT ACTIVITIES

The magnitude of the advisory activities of the NRC has grown steadily since World War II in response to requests from the federal government. Its studies and reports relate to almost every aspect of American life. The current activities of the NRC are conducted by almost 600 committees on which more than 8,000 individuals serve without compensation, supported by a full-time staff of 350 professional and 650 non-professional employees.

PROCEDURES

Requests for studies are received in the Executive Office of the Academy and referred to the office of the appropriate assembly or commission. This normally leads to a project proposal, which is referred for approval to the NRC Governing Board, made up of representatives of the NAS, NAE, and IOM. If no obstacles are interposed, contract negotiation is begun; and when this process is complete, the study begins. Sometimes the study is undertaken by an existing committee, but in many instances an ad hoc committee is appointed for the life of the project.

Selection of members to a working committee is critical. Recommendations to this end are developed by the appropriate assembly or commission after consultation with concerned units within the NRC. All appointments are reviewed by the Office of the President of the Academy where consideration is given to (a) the qualifications of the proposed members, (b) their geographical and institutional distribution, and (c) the proportion of women, minority groups, and younger scientists represented. Appointment is then conditional upon completion of a statement on potential sources of bias and conflicts of interest.

Each report prepared by these study committees is subject to review by a multidisciplinary panel of Academy members under procedures monitored by the Report Review Committee, consisting of representatives of the NAS, NAE, and IOM. None of the reviewers is connected in any way with the study under consideration. The principal purposes of the review are to assure that (a) the report is clear and readable, (b) it is accurate, authoritative, fair, and balanced, and (c) its conclusions and recommendations derive logically from the data and information available. Only upon satisfactory completion of the review is the report approved for release or publication.

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