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news section

A supplement to "New Zealand Engineering" sent to all members of the New Zealand Institution of Engineers

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The Secretary's Newsletter

Council and executive committee notes

Review of Institution administration

DURING the latter part of 1968 some members of Council complained that many of the procedures of the Council and its executive committees were cumbersome and out-dated, and inhibited the speedy and efficient transaction of business. The Auckland Branch offered to investigate the organisation of the Council and its committees and the administration of Institution headquarters. This investigation was done by the aims and activities committee of the Auckland Branch, and its report was laid before the December meeting of the Council.

The Council decided to seek the opinions of all branch committees and all members of Council, and to set up a task committee to study the report of the Auckland aims and activities committee, the comments and suggestions submitted by other Branches and by members of Council, and to make recommendations to Council.

Quite early in its examination, the task committee found that one of the major causes of delay in the conduct of Institution business was the absence of delegation of authority to the officers of the Institution and the Secretariat. Another cause of delay was the decision made by the Council in June 1965 that executive committees could not make, except in cases of urgency, any decisions on matters of policy at those meetings of the committees held in the months between meetings of the Council.

The Council has taken immediate action to remove these causes of delay. A statement on delegation of authority has been promulgated and the decision of the Council of June 1965 has been rescinded. These two important decisions should assist materially in speeding up business. The task committee is continuing to investigate, but, although the committee meets almost every week, it is doubtful if its final report will be ready for presentation to the Council before June at the earliest.

Management training for engineers

(Notes on a report tabled by a task committee of the executive committee for professional qualification.)

"The engineer in management is taken out of the field of definable science and placed deep among 'the cussedness of folks' and the vagueness of politics—the art of the possible in human affairs." This is how the committee that reported in mid-1968 on management training for engineers saw the engineer's major problem in management—adjustment to an entirely different task. But, however much of an effort is needed to make the adjustment, it seems that the profession in New Zealand is ready for it. The Annual General Meeting in Wellington not only asked Council to draw the attention of the whole membership of the Institution to the desirability of extending the engineer's activities into the wider fields of management and community affairs, but looked to Council for active leadership in doing it. This 1968 report is being used by Council as a starting point.

The questions put to the committee were these:

(1) Do engineers need formal education and training in administration and management for the better performance of their duties and to fit themselves for higher positions?

(2) If so:

(a) When would they obtain this education and training?

(b) Where should they obtain these?

(c) How should they obtain these?

(d) Is it desirable, or possible, or both, for engineers to obtain a diploma or certificate indicating what tuition and training have been received and the standard of attainment reached?

Much of the work of the committee in answering these questions involved defining the terms that it was using. "Lack of sharpness", says the report, "is the first lesson for the engineer in management: ease of decision making is not proportional to the number of facts collected". And, again, "There is a wide variation in interpretation of terms and in concepts of what is necessary and what is possible." But the committee found it possible to agree on these basic principles.

First of all, the committee was unanimous in its opinion that engineers should have management training; and they were equally unanimous in rejecting the idea that *all* engineers *must* have training in management. In other words, the committee said, you can be a qualified engineer without a management qualification. But at the same time, it's unlikely that you'll have a successful engineering career without also becoming a manager. So, as you go along, you should be trained in the techniques that you not only will need to use as you progress through the hierarchy of your organisation, but must demonstrably know in order to be considered, at last, for the top jobs. The committee envisioned four particular stages in the life of the engineer, and described the training in management it considered appropriate for each.

Undergraduate. An introduction to principles of management and economics, and to the literature available. *Recommended:* That the prescription for the subject "The Engineer in Society" (recently introduced as com-

Found at the 1969 Conference

A stickpin in blue enamel and gold bearing the words *Rotary International —Past President*. The owner should contact the Secretary of the Institution at Molesworth House, 101 Molesworth St., Wellington N.1.

pulsory for Part 2 of the C.E.I. examination) be followed, and that this subject be made a requirement for graduate membership examinations or exempting qualifications.

Graduate, preregistration. This is the stage of major effort, as the graduate can be expected to have retained the habits of study and will be having his interest aroused in management training because of his encounters with management problems. *Recommended:* A formal management course just prior to registration, preferably one conducted on a group participation basis, which may well have to be organised and conducted by the Institution.

Post-registration to mid-career. Personal development must inevitably be coupled with on-job experience, and training becomes more the responsibility of the employer. However, association with formal management training should continue. *Recommended:* that Institution branches cater for this group by organising special courses and meetings devoted to management topics. In addition, the Institution should take steps to keep older engineers informed of the potential of modern management aids.

Top management. Selection and training arrangements lie with the employer. The previous steps outlined should have prepared the engineer for taking full advantage of further top level training. *Recommended:* That the Institution takes an active interest in top management training developments through senior members of the profession.

After defining the aims of training, the committee went on to consider the quality of the training currently offered. It recommended that one formal qualification should be acquired through existing courses of study at a University. Part-time courses were considered to lack the facilities for the high proportion of discussion sessions, case studies, and active relation of theoretical concepts to practical applications that the committee believed essential for reaching the standard that should be the aim of the profession. However, it was realised that this ideal of university training was not likely to be realised, due to the cost of it. The committee considered that the Institution could meet the need, in part, by establishing a short course, two or three weeks in length, with special emphasis on seminar work and discussion, on a "live-in" basis, and with a subject range specially selected for the needs of the engineer. And, lastly, the committee looked at ways in which it felt the Institution should organise itself generally to take action on management training for its members.

This is the committee's own summary of the report: "The management training committee believes that engineers should have training for management before registration, but that none of the existing courses fit the requirement exactly.

"To qualify through the University as well as through Institution examinations, the C.E.I. requirement for the study of the "The Engineer in Society" should be introduced.

"While the Institution should know of, recommend where suitable, and influence if necessary existing management training, it is recommended that the Institution should arrange a special short residential course for engineers, with emphasis on discussion rather than lecture.

"Those who seek diplomas are recommended to established University courses.

"Finally, the Institution should set up permanent provision within its structure to review and consider and encourage management training and problems."

Among the appendices to the report are a survey of the courses available at present in New Zealand, the prescription for "The Engineer in Society" and a specimen examination paper, and a proposal for a management course to be sponsored by the Institution.

A great deal of work is being done on the committee's recommendations. Action has already been taken to create an information file at the Institution's rooms in Wellington on the management courses available in New Zealand. This is for every member's use, so please write and ask for any information you need, or call in and discuss your problem with us. Too, we are most anxious to use this news section to tell members what's going on in this field—so, if you're going on a course, please let us know and we'll publish your name and the course details. For the guidance of others, we'd also like to publish your ideas on how useful the course was.

The more far-reaching recommendations of the report are under consideration by the executive committee for professional qualification. We hope to publish details of Council's intentions on this topic very shortly.

Candidates for Election

Any member wishing to communicate with the secretary on the subject of these elections should do so not later than the twelfth day of the month following publication.

For Election as Members

Crighton, P. S.; Gurr, M. G. G.

For Election as Associates

Bensemann, C. R.; Kananghinis, G.

For Admission as Graduates

Armstrong, K. J.; Becker, R. W.; Bishop, W. T.; Boulton, C. E., Bryant, M. R.; Carstens, R. S.; Cook, R. J.; Davidson, P. J.; Dean, J. A.; Dunlop, R. J.; Farrar, G. M.; Guest, W. J. D.; Johns, D. R.; Kennedy, M. D.; McCutcheon, R. I.; Meggel, L. M.; Mountjoy, R. B.; Mulholland, D. J.; Reid, M. G.; Scarf, C. R.; Scott, D. M.; Taylor, R. L.; Whitley, W. W.; Wolfgram, I. F.; Wright, C. F.

Graduate for Election as Member

Anderson, B. T. W.

Student for Election as Member

Bell, G. J.

Students for Promotion to Graduates

Black, M. R.; Crang, A. G.; Goodman, G. R.; Hancock, B. L.; Jenks, J. R.; Lear, D. G.; MacKenzie, A. C.; Read, P. W. A.; Sampson, P. A.; Sligo, C. A. S.; Tait, M. W.; Watkins, A. T.; White, P. M.

Salaries for professional engineers in Australia

The Association of Professional Engineers, Australia, has opened a case before the Commonwealth Conciliation and Arbitration Commission to prove that substantial salary increases are needed for professional engineers in Australia. The Association case is based on two main points:

(a) "The general upward movement since 1961 (when the A.P.E.A. presented its last case) of the general community farie of salaries".

(b) "The changes in the nature of the work and responsibility of professional engineers, developments in engineering education, and the increased importance and value of professional engineers' work".

The Association is asking the Commission for a "fundamental reassessment" of the industrial position of professional engineers considered as members of a separate profession. It is not asking for some adjustment of salaries so much as a re-appraisal of the status of the profession and its position in society.

In 1961 the Commission had found that engineer's salary rates were depressed in relation to wage and salary levels in the community generally. For the 1968 submission the Association set out and analysed the movements of 3,000 separate salary rates, or classifications, that had occurred since 1961. It could be shown that 401 salaries had been increased by 50% and over, 669 by 45% and over, and 1,055 by 40% and over. In the same period the award rate for an engineering graduate had increased by 17%, and for an experienced engineer by 14.6%. The A.P.E.A. placed before the Commission more than 900 pages of print-out material

from the computer on such admissions. The standard salaries claimed by the A.P.E.A. are in Table 1.

Counsel for the A.P.E.A. emphasised that not only had the engineers' salary position deteriorated with respect to the whole fabric of salaries, but also that the profession was entitled to substantial salary increase because of changes in duties and responsibilities, changes in the importance of the work, and changes in the community in which the profession works. It was submitted that Australia is undergoing great technological change, and is in a position to gain far more from the work of engineers than most other countries, if not all.

Evidence was submitted to establish that the work of the profession is more valuable now than it was in 1961, more valuable to the employer in terms of cold cash, and more valuable to the community because of technological advances and the application of them by professional engineers. An example quoted was that the supply of electricity was cheaper now, despite rising costs.

J. A. Keely, opening the Association's case, gave examples of the use and development of computers in different branches of engineering, how engineers had been forced to increase their knowledge of much more complex problems and to learn the techniques of computer solution. Examples were given of the use of lasers and lidars. In conclusion he submitted that courses undertaken by engineers today are more intellectually demanding, and are designed to give students a broader and deeper grounding in fundamentals, resulting in engineers who are better qualified for the technology of the present day and of the future.

Professor Hunt of the faculty of engineering at Monash University, the first witness called by the A.P.E.A., gave evidence on changes in engineering education during the past decade. He emphasised the increasing rate at which changes are occurring in engineering education and commented that the boundaries between traditional branches of engineering are becoming less distinct.

Senator Cohen, Q.C., opened the case for the Professional Officers Association, Commonwealth Public Service, and supported submissions made by Mr Keely. He asked for a reassessment of the work value of professional engineers in the 1968 industrial environment and submitted that this work was more complex and more demanding than it was in 1961. It was the engineer, he said, who translated into practical terms the new ideas and the new knowledge that were so much a part of this era of scientific and technological revaluation. Education and technological innovation were among the most important factors in economic expansion. "We must resist the tendency to take for granted so much of the modern achievement in technology," he said. Senator Cohen gave evidence to show that C.P.S. engineers had to deal with increased volume and complexity of work and he described anomalies arising from salary increases received by technicians and technical grades in the Service.

The case for A.A.E.S.D.A. (Association of Architects, Engineers, Surveyors, and Draughtsmen of Australia) was opened by G. Butcher, who commented that, while in 1961 the Commission had found engineer's salaries to be depressed, in 1968 these salaries were in an even deeper depression with regard to community standards. Mr Butcher commented on the apparent fragmentation of the salary structure for professional grades which had developed since 1961 and compared this to an apparently deliberate policy by the Commonwealth Public Service Board to unify and broadband other wage structures, such as the technical, administrative, and clerical grades.

This summary of the national revaluation case report for professional engineers' salaries is taken from *The Professional Engineer*, 22 (9) (November 1968). The case was opened on 8 October 1968 and was still proceeding in February 1969.

TABLE 1

Professional Engineers' Salaries, Commonwealth Public Service, Australia, October 1968

Engineer Class	*Standard salary Oct. 1968**	*Salaries claimed in C.P.S. in current case*
	$	$
Class 1	3,154-4,890	4,673- 7,093
Class 2	5,212-5,866	7,583- 8,603
Class 3	6,187-6,949	9,103-10,243
Class 4	7,263-7,771	10,843-11,743
Class 5	8,085-8,633	12,343-13,343

*An additional $228 adjustment is paid on all salaries. Graduate entry point claimed in current case: $5,113.

N.Z.I.E. Branch Notes

Northland

The first general meeting for 1969 was held on 27 January. B. Cameron of the New Zealand Refining Co. presented a paper entitled "Critical Path Methods in Relation to the Shutdown for Maintenance of an Oil Refinery". Mr Cameron first outlined the principles of critical path methods and then dealt with the particular problems relating to an oil refinery. The arrow diagram for a shutdown involved 800 operations, from the beginning of shutdown through the maintenance operations to the end of the starting up sequence. The programme is computerised in Auckland before and during a shutdown. By using critical path methods, the shutdown period is reduced, with a resultant saving of three to four days production.

The meeting was attended by 33 members and guests.

Mechanical engineering drawing office practice

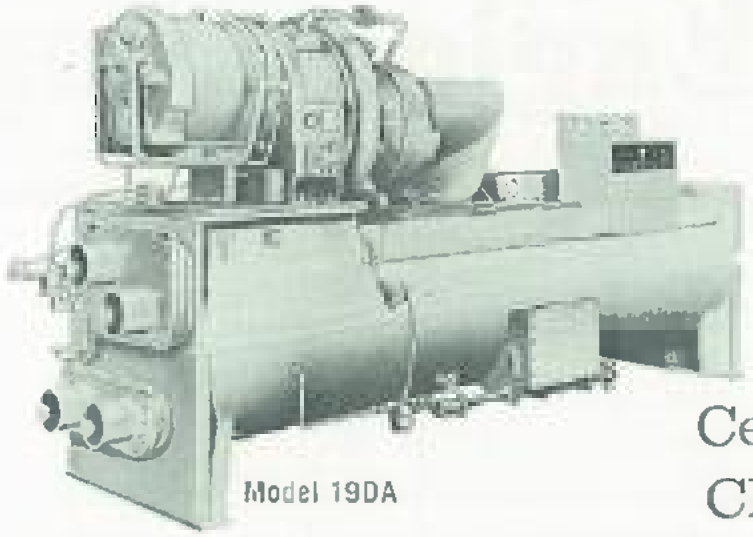
Early in 1967 a request was received by the Standards Association to issue a Standard Recommendation in the field of mechanical engineering drawing office practice with the object of standardising practice throughout industry, government departments, and educational establishments of New Zealand. This new standard would be complementary to NZSR 24: 1966, "Drawing office practice for architects and builders" and NZSR 25: 1967 "Electrical drawing office practice".

As a result of this request, the S.A.N.Z. set up a mechanical engineering drawing office practice committee with the following goals:

(a) To promulgate a New Zealand document for drawing office practice for mechanical engineering purposes.

(b) To evaluate BS 308, Australian Standard CZ1 and other relevant documents, and to determine their respective suitability, with amendments as necessary, for adoption in New Zealand.

Membership of the committee included representatives of the Department of Education, Government Printer, Ministry of Works, N.Z. Electricity Department, N.Z. Institution of Engineers, N.Z. Institute of Draughtsmen, N.Z. Manufacturers' Federation,



Model 19DA

Carrier

Hermetic Centrifugal Liquid Chilling Packages

DESCRIPTION

The Carrier 19DA Hermetic Centrifugal Liquid Chilling Units are compact, large capacity centrifugal refrigeration machines of completely hermetic design. They provide chilled water for air conditioning or process liquid cooling. Thirteen standard sizes provide nominal capacity from 102 thru 397 tons. Forty-eight compressors, 14 motor sizes, and 13 cooler-condenser combinations permit selection of the most economical and efficient compressor-motor-cooler-condenser combination to match exacting individual refrigeration requirements. Their relatively quiet operation and low vibration level permit installation on roofs and upper floors of buildings. Installations may consist of single machines or multiple-unit systems.

FEATURES

- **Automatic Controls** – Electronic controls provide continuous monitoring of machine operation. Machine capacity is automatically modulated between 100% and 10% to correspond with required cooling load. This automatic control reduces operating costs by maintaining machine at peak efficiency.
- **Refrigerant Agitation** – Increases refrigerant level in the cooler during partial load conditions to ensure peak machine efficiency at all load conditions.
- **Refrigerant Cooled Motor** – Subcooled liquid refrigerant cooling maintains peak operating efficiency and extends motor life.
- **Automatic Thermal Purge** – Ensures peak operating efficiency of the refrigeration system by automatically removing air, water and other noncondensables.
- **Reduced Power Cost** – Electrical Demand Control may be preset to limit compressor motor current during low cooling load seasons.
- **Hermetic Design** – Hermetic design and operation prevents leakage of costly refrigerant. Machines are factory leak tested with the most rigorous and advanced testing techniques.
- **Self-Aligning Transmission** – Quiet operation and extremely low transmission loss is ensured because gears are dynamically positioned under all operating conditions. The Carrier Dynapoise® Transmission between the motor and compressor is a unique development in gear suspension.
- **Modern Retention System** – Compressor and motor components are coupled and retained by a V-Band Retention System similar to those used on modern jet aircraft engines. Equal loading around the complete periphery of the flanges is ensured.
- **Modular Lubrication Package** – Contains pump, motor, filter, cooler, pressure controls, hermetic electrical terminals; extremely reliable and easy to service.
- **Pressure Lubrication System** – Pressurized lubrication immediately before and during machine operation protects bearings and transmission. Adds years of compressor and motor life with minimum maintenance.
- **Rugged Construction** – Unishell of carbon steel plate welded to heavy steel tube sheets; copper tubes with extruded fins; heavy carbon steel divider plate separates cooler and condenser inside unishell.
- **Compact** – Complete refrigeration package occupies a minimum of valuable machine room space. The compact 19DA consists of a cooler and condenser contained in a single shell, with compressor, controls, and purge unit mounted on top of the shell.
- **Easy Installation** – Can be placed directly on the floor. No need for concrete bases or foundations.

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