

# Notices

## STRASZACKER REPORT

The Institute has received, for its information, a copy of the following letter, which was addressed to The Federation of Societies of Professional Engineers:

Dear Sir,

**REPORT: COMMISSION OF ENQUIRY INTO THE METHODS OF TRAINING FOR UNIVERSITY DEGREES IN ENGINEERING (STRASZACKER REPORT)**

I have pleasure in informing you that the Honourable J. P. van der Spuy, Minister of National Education, has accepted the above-mentioned report *in toto* as being of directive nature and has approved that interested parties be encouraged to make representations regarding those particular recommendations which have not yet been satisfactorily dealt with, to those bodies responsible for their implementation.

Since your Federation is probably in the best position to ensure, through its functional framework, that every interested person or body, irrespective of whether employment or training is provided, takes cognizance of the Minister's decision, this Department is taking the liberty of requesting you to undertake the announcement of the news.

The recommendation concerning differentiated salary scales for teaching staff and student/teacher relationship is receiving the attention of the Commission of Enquiry into

University Affairs, the report of which is expected by 31 March 1973. This Department is devoting independent attention to recommendations in which it is intimately concerned, e.g. matriculation exemption for holders of a National Diploma for Engineering Technicians in particular circumstances, the content of science courses with a view to more time for laboratory work and exercises aimed at the development of inductive reasoning, the provision of certain textbooks in Afrikaans, etc.

Should you consider that certain interested parties cannot be effectively reached through your channels, the Department would be glad to receive suggestions from you regarding steps which could be taken.

Yours faithfully,

(signed)

for SECRETARY OF NATIONAL EDUCATION.

Geagte Heer,

**VERSLAG: KOMMISSIE VAN ONDERSOEK NA DIE METODE VAN OPLEIDING VIR UNIVERSITEITSGRADE IN INGENIEURSWESE (STRASZACKER-VERSLAG)**

Graag deel ek u mee dat Sy Edele J. P. van der Spuy, Minister van Nasionale Opvoeding, bogemelde verslag in sy geheel as rigtinggewend aanvaar het en goedgekeur het dat belanghebbendes aangeraai word om ten opsigte van bepaalde aanbevelings wat nog nie bevredig-

end afgehandel is nie, versoek te rig tot daardie instansies wat vir implementering daarvan verantwoordelik is.

Aangesien u Federasie waarskynlik die beste in staat is om deur u funksionele opset te sorg dat elke belangstellende persoon of instansie ongeag of hy werk of opleiding verskaf, van die Minister se besluit kennis neem, neem die Departement die vrymoedigheid om te versoek dat u die bekendmaking van die nuus onderneem.

Die aanbeveling aangaande gedifferensieerde salarisskale vir doserende personeel en student/dosent-verhouding geniet die aandag van die Kommissie van Onderzoek na die Universiteitswese wie se verslag teen 31 Maart 1973 verwag word. Hierdie Departement gee selfstandig aandag aan aanbevelings waarby hy nou betrokke is b.v. matrikulasierystelling aan houer van 'n Nasionale Diploma vir Ingenieurstechnici in bepaalde omstandighede, die inhoud van wetenskapkursusse met die oog op meer tyd vir laboratoriumwerk en oefeninge ter ontwikkeling van induktiewe redenering, verskaffing van sekere handboeke in Afrikaans, ens.

Indien u meen dat sekere belanghebbendes nie effektief deur u kanale bereik kan word nie, ontvang die Departement graag voorstelle van u oor handelinge wat gedoen kan word.

Die uwe,

(geteken)

SEKRETARIS VAN NASIONALE OPVOEDING

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## Second International Symposium on Jet Cutting Technology

This symposium, sponsored and organised by BHRA Fluid Engineering, of Cranfield, England, is to be held at St John's College, Cambridge, from 2nd to 4th April, 1974. The symposium's main theme is the successful application of jet cutting techniques in industry (especially in technological production), in civil engineering, and in mining, but its

scope includes fundamental aspects of the fluid mechanics of high-pressure jets and equipment for their generation. Papers on practical aspects—emphasizing actual use or describing experiences with commercially viable systems—are especially welcome. Safety aspects and system failure will also be discussed.

Titles and synopses of papers should be submitted before 31st May, 1973, and the completed manuscripts of the papers accepted will be required by 31st October, 1973. Further information is available from: The Organising Secretary, 21SJCT, BHRA Fluid Engineering, Cranfield, Bedford MK430AJ, England.

## Competition for student members of the South African Institute of Mining and Metallurgy

Each year the Institute offers a prize (or prizes should the entries warrant it) of up to R100 for the best paper or dissertation on a topic appropriate to the interests of the Institute. The competition is open to all Student Members of the Institute.

A Student Member who is in full time study at a university may submit the dissertation or thesis he has to write in part fulfilment of his university degree, provided that it is presented in a manner and on a topic suitable for publication in the journal.

Entries for 1973 should reach the Institute by 31st December, 1973.

## Techomin 74 - World Mining Fair

The above World Mining Fair, under the sponsorship of the International Committee for the Organization of World Mining Congresses and the Peruvian Government, is to be held in Lima, Peru, from 3rd to 12th November, 1974, to coincide with the 1974 World Mining Congress, which is to be held in Lima. The theme of the congress is "Prognosis of the development of mining up to the year 2000". The Fair is to be held in the grounds of the Pacific International Trade Fair, which has a surface area of some 240 000 square metres and in which 23 foreign nations have permanent pavilions.

Any enquiries about the Fair should be directed to Mr Gosta A. Lettersten, Director General, Feria Internacional del Pacifico, Apartado 4900, Lima, Peru.

## NIM Reports

The following reports are available free of charge from the National Institute for Metallurgy, Private Bag 7, Auckland Park, Johannesburg.

### Report No. 1435

*The determination of chromium, manganese, iron, cobalt, and nickel by atomic-absorption spectrophotometry using the nitrous oxide-acetylene flame.*

The method developed (a detailed laboratory procedure is given as an appendix) is suitable for the determination of the transition elements in ores and silicate materials.

The sample is dissolved in hydrofluoric, nitric, and perchloric acids, and the residue is fused with sodium peroxide. Potassium nitrate is added as a de-ionizing agent, and the atomic absorption of the elements in solution is measured by use of a lean nitrous oxide-acetylene flame. There is no interference from the elements that are likely to occur in ores and silicate materials, and the coefficient of variation of the method is less than 2 per cent.

### Report No. 1463

*Liquidus temperatures and activities of manganese (II) oxide in slags associated with the production of high-carbon ferromanganese alloys.*

A study was made of the slags that are typical of those arising during the production of ferromanganese in South Africa and that belong to the system  $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-MgO-CaO-MnO}$ . The study was directed at the determination of the liquidus temperatures, and at the activities at  $1500^\circ\text{C}$  of MnO in such slags. The liquidus temperatures for slags with an MnO content of 13 per cent by mass are somewhat lower than those that belong to the quaternary system  $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-MgO-CaO}$ . Values for the activity coefficients of MnO are presented as iso-activity contours on pseudoternary sections at constant selected alumina contents. It is possible to assess the effect of slag composition on the value of the activity coefficient, namely the beneficial effect of increased basicity, the effects of substitution of MgO by CaO, and the amphoteric nature of  $\text{Al}_2\text{O}_3$ . Factors that emerge from this study (e.g., the rate of reduction of MnO from the slag, the degree of reduction of silicon from the slag, the viscosity of the slags, and the liquidus temperatures) may all be employed in conjunction with the activity values of MnO as pointers to the optimum slag composition for

the efficient production of high-carbon ferromanganeses.

### Report No. 1467

*The spectral analysis of solutions. 1. The analysis of rare-earth minerals.*

A technique is described for the spectrochemical determination of the individual rare-earth elements in rare-earth minerals after they have been fused, leached, and dissolved. The sample is fused with potassium bifluoride and leached with hydrofluoric acid solution in which the rare-earth group, thorium, calcium, and uranium (IV) are insoluble. The residue is dissolved in a mixture of nitric and perchloric acids, fumed for the removal of excess perchloric acid, and finally dissolved in hydrochloric acid. Calcium is separated from the rare earths by ammonia, and the precipitate is dissolved in hydrochloric acid. Hafnium (internal standard), lithium metaborate (buffer), and a miscible solvent consisting of ethylene glycol and acetone are added, and the mixture is made up to volume. This solution is excited by a plasma-jet source, and the spectra are recorded photographically. The results of typical analyses are given, together with precision data. The performance of the plasma jet is compared with that of the rotating disc on the same solutions. The range of concentration covered is between 3 per cent and over 50 per cent of total rare-earth oxides.

### Report No. 1479

*Infrared studies of the adsorption of oleate species on mineral surfaces, with special reference to fluorite.*

This report reviews the application of infrared spectroscopy to the elucidation of the nature of the adsorbed species when various non-sulphide minerals are treated with aqueous sodium oleate or oleic acid. Most of the work described in the literature has been concerned with fluorite or precipitated calcium fluoride, and considerable confusion has arisen about whether the spectra of the surface products represent sodium oleate, calcium oleate, oleic acid, or various combinations of the three. The investigation described here was aimed at resolving these discrepancies, and showed that the spectrum of the adsorbed species had peaks at

1613 and 1562  $\text{cm}^{-1}$ . It is suggested that the former corresponds to a surface chemisorbed calcium oleate and the latter to both surface calcium oleate and physically adsorbed sodium oleate. At the alkaline pH values used, the oleic acid peak at 1709  $\text{cm}^{-1}$  was absent from the spectrum.

#### **Report No. 1483**

*The South African manpower requirements in extractive metallurgy.*

Figures obtained from the South African mineral industry and universities indicate that the graduation of metallurgists is not keeping pace with the requirements of industry. The present critical shortage of metallurgical manpower will therefore be aggravated over the next five years at least, thus stifling the growth of the mineral industry, and inevitably the economy of the country will suffer. Australia foresaw a similar danger years ago and initiated a drive to expand its mineral production. The result was that Australia's mineral production has grown much faster than South Africa's and actually passed it in 1970. The report recommends that South Africa should immediately initiate a similar drive to attract the required manpower to its mineral industry.

#### **Report No. 1484**

*Cost estimates for the production of copper wirebars from sulphidic ores.*

Capital and operating costs are estimated for the annual production of 15 000, 50 000, and 100 000 tonnes of copper wirebars from sulphidic ores having copper contents of 0,5, 1,0, and 1,5 per cent. The processes considered for the treatment of the ores include flotation of the copper minerals, smelting of the flotation concentrates, and electrolytic refining. The costs are intended to serve as a basis for comparison with the costs incurred in the processing of sulphidic ores by other methods.

#### **Report No. 1486**

*Review of the fluoro-chemical industry of the World.*

An investigation of the World and local markets for fluoro-chemicals has revealed that only hydrofluoric acid can be produced economically in South Africa, and that South Africa would find it difficult to ex-

tend its fluoro-chemical industry beyond the small existing production of hydrofluoric acid and fluorocarbons Nos. 11 and 12. It is recommended that South Africa should increase its production of acid-grade fluorospar so that about 100 000 tonnes per annum could be exported as pellets for use in basic-oxygen steelmaking. These agglomerates could earn about R7 million per annum in foreign exchange. The agglomeration of fluorospar and the inclusion of additives is suggested as a fruitful field of research.

#### **Report No. 1490**

*The adsorption of krypton, nitrogen, and water vapour on sodium oleate.*

The adsorption of krypton, nitrogen, and water vapour on pure sodium oleate was studied to ascertain whether the behaviour was Type III and also whether water vapour penetrated the sodium oleate lattice. The investigation arose from a previous study of the adsorption of these gases on various minerals containing preadsorbed oleate, in which penetration was obtained with certain materials containing multilayers of preadsorbed oleate. There were also indications that Type III adsorption may occur on the pure preadsorbate. The results showed that, although the isotherms had rounded knees and gave low values for the B.E.T. constant  $c$ , they were nevertheless Type II in shape. The isotherms for water adsorption did not show the vertical regions associated with penetration, but the slow rate of adsorption and the high ratio of water surface area to nitrogen surface area (4,0) were strong indications that water vapour had diffused into the bulk.

#### **Report No. 1491**

*Technology and economics of the Claus kiln under South African conditions.*

The Claus process appears to be the most economical of the effective processes available for the recovery of elemental sulphur from the hydrogen sulphide given off in various metallurgical processes. The Claus kiln converts about 90 to 95 per cent of the hydrogen sulphide present to sulphur, and simultaneously raises about 2,6 tonnes of steam per tonne of sulphur produced. Depending on the size of the plant, the cost of the

sulphur is R36,49 to R3,48 per tonne. If pollution-control regulations require a maximum sulphur dioxide content of 0,5 per cent in gases vented to the atmosphere, the Claus process would have to be supplemented by additional stages of catalytic conversion and the erection of a high stack, or by a process that recovers sulphur from the Claus plant's off-gases.

## **De Beers Report**

The following publication is available free of charge from De Beers Industrial Diamond Division Limited, P.O. Box 916, Johannesburg.

*The dry grinding of tungsten carbide/steel combinations with diamond wheels.*

An accurate appraisal of the dry grinding of carbide together with steel and bronze material reveals DXDA-MC diamond grit as the most economical abrasive. Recommendations are made on the selection of optimum wheel and machine parameters for minimum total costs.

## **Metallurgical Directory**

The Israel Export Institute has just published the first edition of the *Israel Metal Industry Directory*, which gives pertinent information relating to the 750 Israeli manufacturers of metal products—addresses, annual turnover, and products—and to consulting engineers and export companies specializing in metal products. The Directory is available from the Metal Products Centre, Israel Export Institute, P.O. Box 29732, Tel-Aviv, Israel. The price is \$3.50 including postage. Free issues are available to government officials and agencies.

## **Visiting Nuclear Scientist**

The National Institute for Metallurgy has announced that Professor Vincent P. Guinn, of the University of California, is to spend his sabbatical leave (April to June) working with the Activation Analysis Research Group of the National Institute for Metallurgy. The Group works under the guidance of Pro-

fessor J. P. F. Sellschop in the Nuclear Physics Research Unit of the University of the Witwatersrand, and is mainly concerned in applying the technique of neutron-activation analysis to metallurgy and mineralogy, and in developing the technique as a tool for use in geochemical exploration. The projects undertaken by the Group involve, among other things, kimberlites and associated heavy minerals, the granites of the Barberton Mountain Land and the Bushveld Igneous Complex, characterization of the various sedimentary horizons of the Witwatersrand System, the feasibility of aerial geochemical surveys, and the use of hydrogeochemistry in the exploration for strategic minerals.

Professor Guinn is a leading authority on the use of neutron-activation techniques in chemical and geochemical prospecting, and has a very wide experience of the application of these techniques to industrial problems. Before taking up his present post as Professor of Chemistry at the University of California in Irvine, he was Head of the Radiochemical Group of the Shell Development Company and then Manager of the Activation Analysis Programme for Gulf General Atomic Inc.

Activation analysis permits the determination of mineral elements that are present in very low concentrations—less than 10 parts per million. The significance of the

technique becomes obvious when it is realized that these elements of low concentration comprise about half the elements in the periodic table and include some elements of great geochemical interest. A very important application of activation analysis is to the rapid, accurate, and precise determination of oxygen, because, although oxygen is the most abundant element in the Earth's crust, it is usually determined only indirectly (by calculation).

Professor Guinn's contribution to this highly specialized analytical field includes well over one hundred technical papers that have appeared in leading journals dealing with neutron-activation techniques.

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# GUIDE TO THE PREPARATION OF PAPERS FOR PUBLICATION IN THE JOURNAL OF THE SOUTH AFRICAN INSTITUTE OF MINING AND METALLURGY

The following notes have been compiled to assist authors in the preparation of papers for presentation to the Institute and for publication in the *Journal*. All papers must meet the standards set by the Council of the Institute, and for this purpose all papers are referred to at least two referees appointed by the Council.

Although the worldwide readership of the *Journal* results in a preference for papers in English, the Council treats papers in Afrikaans on an equal basis, but, to meet the needs of the majority of readers, an English summary of some 500 to 750 words should be provided.

## STANDARDS FOR ACCEPTANCE

To merit consideration, papers should conform to the high standards that have been established for publication over many years. Papers on research should contain matter that is new, interpretations that are novel or of new significance, and conclusions that cast a fresh light on old ideas. Descriptive papers should not be a repetition of well-known practices or ideas but should incorporate developments that would be of real interest to technical men and of benefit to the mining and metallurgical industry.

In some cases, a well-prepared review paper can be of value and will be considered for publication. All papers, particularly research papers, no matter how technical the subject, should be written with the average reader of the *Journal* in mind, to ensure wide interest.

The amount of textbook material included in a contribution should be the minimum essential to the argument. The length of a paper is not the criterion of its worth, and it should be as brief and concise as possible, consistent with the lucid presentation of the subject. Only in very exceptional circumstances should a paper exceed 15 pages of the *Journal* (15 000 words if there are no tables or diagrams). Six to ten pages is more normal.

**NOTE:** Papers in the *Journal* are printed in 10 point type, which is larger than the 8 point type used on this page. For special publications, Council may decide on page sizes smaller than A4 used for this *Journal*.

The text should be typewritten, double-spaced, on one side only on A4 size paper, leaving a left-hand margin of 4 cm, and should be submitted in triplicate to facilitate the work of the referees and editors.

## LAYOUT AND STYLE

### *Orthodox sequence*

Title and author's name, with author's degrees, titles, position.

Synopsis, including a brief statement of conclusions.

An Afrikaans translation of the synopsis.

Introduction.

Development of the main substance.

Conclusions, in more detail.

Acknowledgements.

References.

**Title:** This should be as *brief* as possible, yet give a good idea of the subject and character of the paper.

**Style:** Writing should conform to certain prescribed standards.

The Institute is guided in its requirements by:

Collins, F. H., *Authors & Printers' Dictionary*—Oxford University Press.

Hart, H. *Rules for Compositors and Readers*—Humphrey Milford (familarly known as the *Oxford Rules*).

Fowler, H. W. & F. G., *The King's English*—Oxford University Press.

**General:** A few well selected diagrams and illustrations are often more pertinent than an amorphous mass of text. Overstatement and dogmatism are jarring and have no place in technical writing. Avoid the use of the first person, be objective, and do not include irrelevant or extraneous matter. Avoid unnecessary use of capitals and hyphens; punctuation should be used sparingly and be governed by the needs of sense and diction. Sentences should be short, uninvolved and unambiguous. Paragraphs should also be short and serve to separate basic ideas into compact groups. Quotation marks should be of the 'single' type for quotations and "double" for quoted matter within quotations.

Interpretations in the text should be marked off by parentheses ( ), whereas brackets [ ] are employed to enclose explanatory matter in the text.

Words to be printed in italics should be underlined *singly*. For small capitals they are to be underlined **DOUBLY** and for large capitals **TREBLY**.

If there is any problem in producing formulae accurately by typewriter, they should be handwritten in ink.

Abbreviations and symbols are laid down in *British Standard 1991*. Abbreviations are the same for the singular and plural, e.g., cm for centimetre and centimetres, kg for kilogram and kilograms. Percentages are written in the text as per cent; the symbol % is restricted to tables. A full stop after an abbreviation is used only if there is likely to be confusion of meaning.

**Metric System:** The *Système International d'Unités* (SI) is to be used for expressing quantities. This is a coherent system of metric units derived from six basic units (metre, kilogram, second, ampere, kelvin, and candela), from which are derived all other units, e.g., the unit of force is the newton (N) for kilogram metre per square second (kg m/s<sup>2</sup>). Always use the standard metric abbreviations.

The comma must be used as a decimal indicator and must not be used for separating groups of digits. For ease of reading digits should be grouped in threes counting from the decimal indicator towards the left and right. However, where there are only four digits to the left or right of the decimal indicator, there should be no grouping.

**Illustrations:** Drawings and diagrams are to be in black India ink and should be about 18 cm wide. When submitting graphical representations, avoid a fine grid if possible. Curves should be in heavy line to stand out. Lettering too should be bold, as a reduction in size is often involved in the printing process.

Numbering of tables should be in Roman numerals: I, II, etc., and figures in Arabic numerals: Fig. 1, Fig. 2, etc. (Always use the abbreviation for figure.) Photographs should be black and white glossy prints.

As a guide to the printer, the author should indicate by means of notes in the typescript where tables and figures, etc. are to appear in the text.

**Paragraphs:** A decimal system of numbering paragraphs may be used when the paper is long and complicated and there is a need for frequent reference to other parts of the paper.

**Proof correction:** Galley proofs are sent to authors for the correction of printers' errors and not for the purpose of making alterations and additions which may be expensive. Should an author make alterations that are considered excessive, he may be required to pay for them. Standard symbols as laid down in *British Standard 1219C* should be used.

## SYNOPSIS

It is most important that the synopsis should provide a clear outline of the contents of the paper, the results obtained, and the author's conclusions. It should be written concisely and in normal, rather than abbreviated, English, and should not exceed 250 words, except when an English summary of an Afrikaans paper is involved. While the emphasis is on brevity, this should not be laboured to the extent of leaving out important matter or impairing intelligibility. Summaries simplify the task of abstractors and therefore should present a balanced and complete picture. It is preferable to use standard rather than proprietary terms.

## FOOTNOTES AND REFERENCES

Footnotes should be used only when they are indispensable. In the typescript they should appear immediately below the line to which they refer and not at the foot of the page.

References should be indicated by super-script, thus . . . <sup>1</sup> . . . <sup>2</sup>. Do not use the word *Bibliography*. When authors cite publications of other societies or technical and trade journals, titles should be abbreviated in accordance with the standards adopted by this *Journal*.

## GENERAL

The Council will consider the publication of technical notes taking up to three pages (maximum 3000 words).

Written contributions are invited to the discussion of all papers published in the *Journal*. The editors, however, are empowered by the Council to edit all contributions. Once a paper or a note has been submitted to the Institute, that document becomes the property of the Institute, which then holds the copyright when it is published. The Institute as a body is, however, not responsible for the statements made or opinions expressed in any of its publications. Reproduction from the *Journal* is permitted provided there is full acknowledgement of the source. These points should be borne in mind by authors who submit their work to other organizations as well as to the Institute.