IS BULLETIN

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Regular Features

The Cover — *A general view of the bottling plant of the new dairy of Maharashtra Government at Worli, Bombay.*
India today has some of the largest dairies in the world. The orderly growth of the industry during the last two decades is in no small measure the result of standardization activity in the country. About 60 Indian Standards have been formulated by ISI covering different aspects of this industry. Several dairy products and equipment, such as infant milk foods, condensed milk and glass milk bottles carry the ISI Certification Mark (see also P 129).

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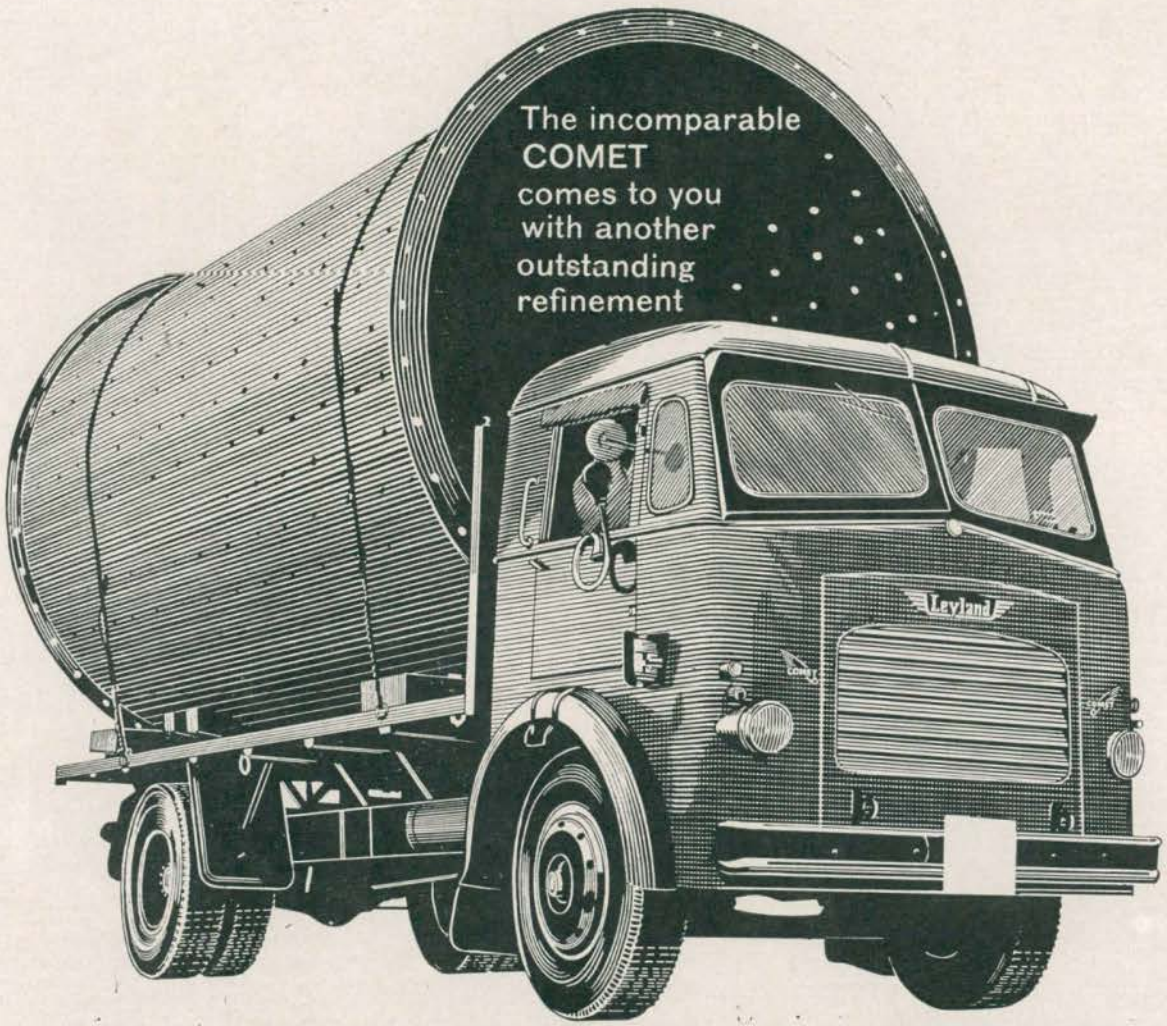

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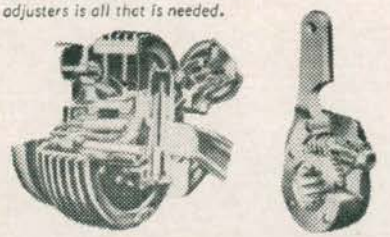

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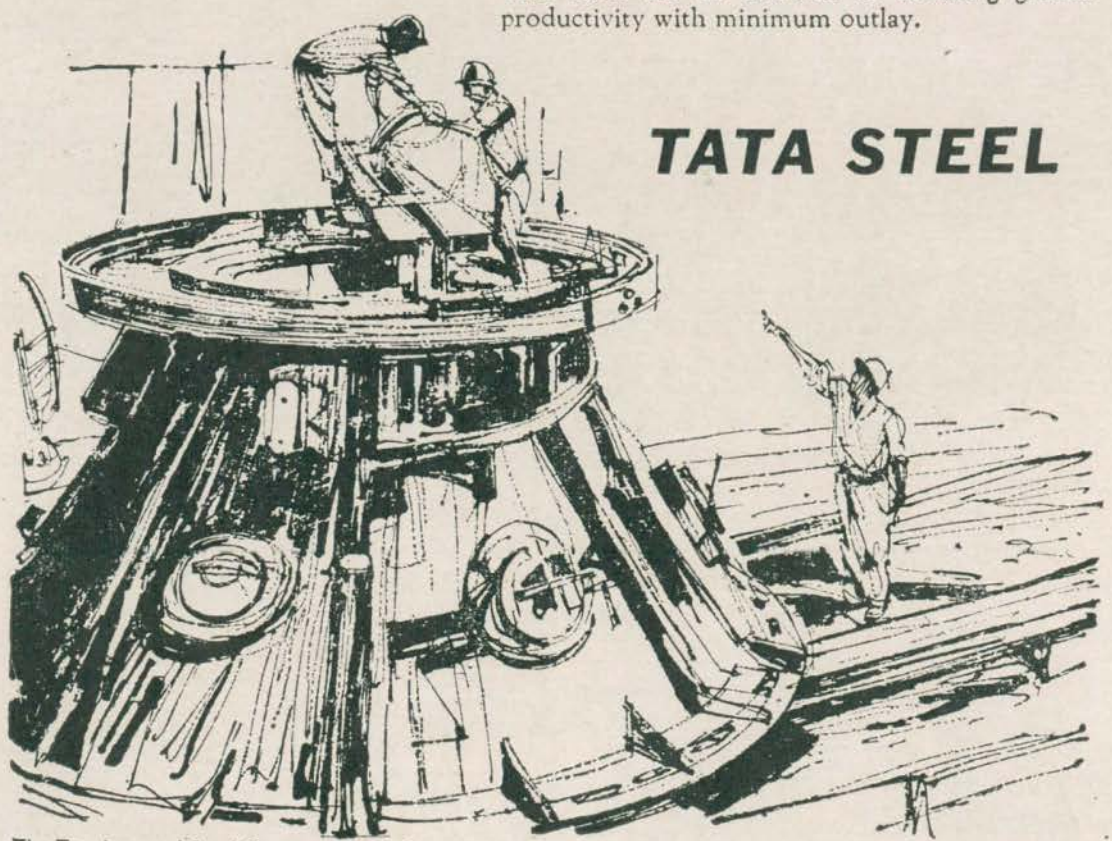

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For the benefit of our readers we list below the products, carrying the ISI Certification Marks, advertised in this issue.

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Biscuits (excluding wafer biscuits) (IS : 1011-1957)	i) Britannia Biscuit Co. Ltd., Calcutta ii) J. B. Mangharam & Co., Gwalior iii) Kolay Biscuits Co. Pvt. Ltd., Calcutta	A38 A19 A30
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c) PVC insulated cables, single core (unsheathed), 250/440 and 650/1100 volts grade with copper or aluminium conductors d) Twin flat with or without earth continuity conductor (PVC sheathed), 250/440 volts grade [IS : 694 (Parts I & II)-1964]	P. V. C. Wires & Cables Pvt. Ltd., Calcutta	A34
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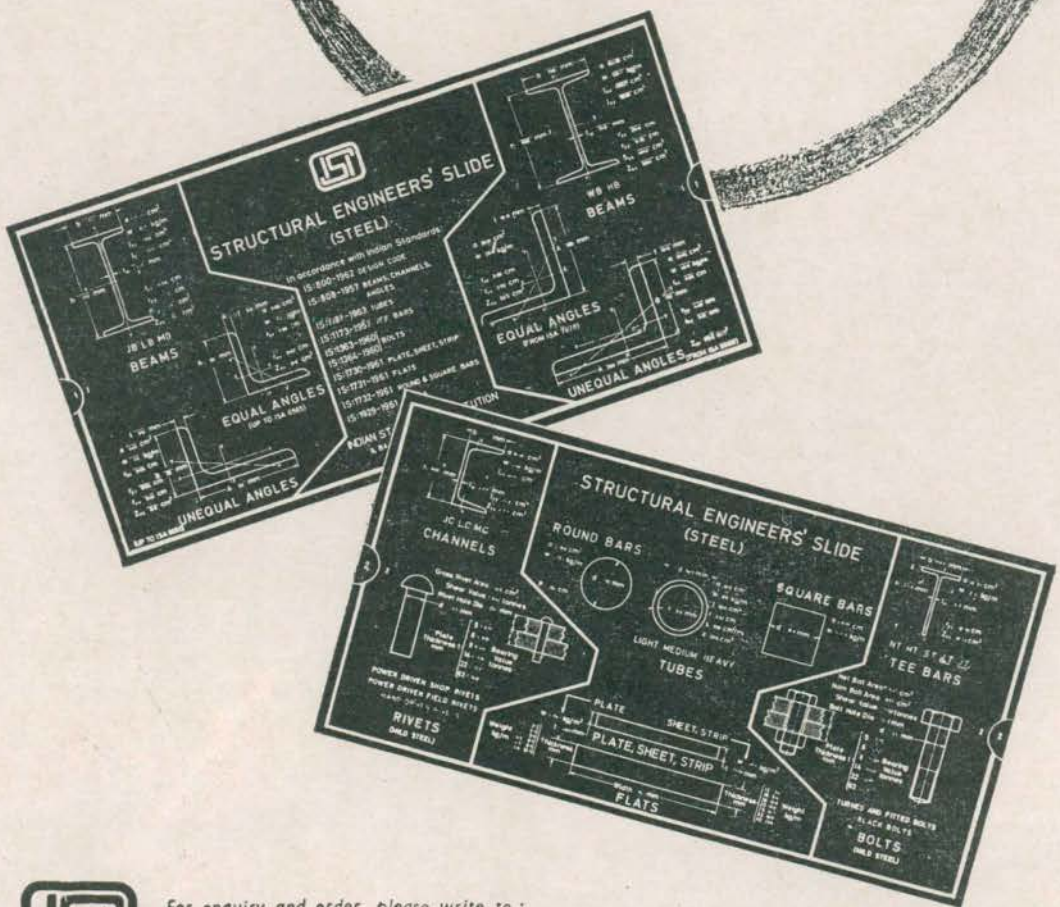

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EDITORIAL

Dairy Industry—A New Look

■ The production of milk and milk products, once a part of household chores, has undergone a radical change in the last two decades. The 'home cow' has completely disappeared from urban centres, and cattle stables, once the bane of city life, are dwindling rapidly. Even at the close of the Second World War, the manufacture of products like condensed milk, milk powder, infant milk foods and processed cheese, would have seemed something unreachable by an 'industry' that was steeped so deep in ancient traditions. In sharp contrast, to-day, plans are afoot even to export some of the dairy products. The progress of the infant dairy industry by any standard is thus remarkable. There is, no doubt, still a great shortage of milk and few dairy plants can boast of running to full capacity throughout the year but a new idea needs time to take root. Judging by past achievement, this shortage is only a temporary phase and the filling of the gap between demand and supply is merely a matter of organization.

At one time it was taken for granted that when a dairy plant was put up, milk would start flowing without any special efforts being made. To a certain extent that held true initially. But to satisfy the regular and ever-increasing demand for milk, systematic planning is necessary and things cannot be left to be sorted out by the farmer with his limited resources. The producer must be prompted to utilize a part of his land for growing fodder, cattle must be improved and milch animals fed scientifically to ensure economic milk yields. Above all a guaranteed market with a price sufficiently remunerative must be found for the producer all the year round. Experience shows that the farmer is not averse to use his resources for milk production which assures him not only fair returns but also a ready on-the-spot cash throughout the year.

The continuing shift in population from rural to urban centres has imposed unforeseen strains on the milk industry which has been called upon not only to meet its previous commitments but also to cater to schools, canteens and similar other services. Milk famine during the years immediately following the Second World War helped to highlight this problem. This brought about a re-orientation in outlook and led to collection of milk in bulk even from remote and normally inaccessible areas. Being a highly perishable commodity, it was obvious that modern techniques were required to prevent wastage and to place milk at the doorstep of the consumer 'as milk'. Refrigerated transport was introduced and the first truly commercial fluid milk plant was established in Bombay in 1948 at Aarey. Since then much more milk has flown through the pipelines—nearly 110 plants have been set up and more are in the process of erection.

To-day, India has some of the largest dairies in the world with up-to-date processing equipment. This rapid stride, in a great measure, is due to the foresight of some of the international organizations like UNICEF, FAO and Colombo Plan who gifted the plants and to the enterprising private and co-operative sectors. The know-how has been evolved, by and large, by the local talent. Another remarkable feature is the growth of the dairy equipment industry. With the exception of a few specialised components, the country is in the happy position to manufacture the entire complex of equipment and spares needed for the fluid milk plants. In fact, India can build up, from within its manufacturing resources, a flourishing trade in dairy and food equipment but for want of stainless steel which at present has to be imported.

For an industry, the turnover per unit of which is very small and where large volumes of milk must be purchased, processed, tested and delivered twice a day at least, it is to be expected that a rigid code of practice has to be evolved. This, in turn, has led to standardization at all stages, starting with assessment of quality of raw materials, designs of plant and equipment, packaging, management, and examination of the products at all stages. Under the aegis of the Indian Standards Institution, nearly 60 standards have been developed covering almost all phases of the complex dairy operations, such as dairy equipment, layout plans for dairy laboratories, methods of test, laboratory apparatus, dairy products and infant milk foods. Specifications covering milk storage tanks, strainers, vats, pasteurizers, coolers, road tankers, bottles and their crates, etc, have greatly helped in stimulating production of these items indigenously. A can of milk, for example, needs nearly a dozen components harmoniously dovetailed to make it into a standard seamless container which could keep milk in hygienic condition, free from outside contamination, while a tin of baby food must pass through nearly thirty tests before it leaves the plant with the ISI Certification Mark. This goes to show how widely standardization has permeated into the dairy industry.

The progressive outlook of the nascent dairy industry is illustrated by the zest with which current problems are discussed by dairymen with a view to exchanging experience and introducing innovations. The Third Dairy Industry Conference held recently in Bombay, served to highlight the manner in which these problems are being faced. To maintain its leadership, a modern industry like the dairy industry, must invest in and rely heavily on research to keep up its progressive outlook. This, in turn, would make available expert knowledge and experience and also promote standardization activity. Happily, the young Indian dairy industry is not oblivious of these aspects and is striving to serve the nation in the best manner possible.

J. O. KNOWLES
Metal Industries Limited, London

A More International Approach to Standards

Recognition of common interests*

For national standards to serve as an effective instrument of regulating exchange of goods between one nation and another, they must necessarily be guided by internationally agreed recommendations, subject, of course, to some peculiar requirements of trade and industry within a country. It is precisely this approach which has been ISI's guiding principle in its work of producing Indian Standards, and happily this is now beginning to find favour with other countries. Among other factors, this trend is likely to prove more economical as well as speedy in formulating national standards because a smaller number of meetings would be required for working on the proposed standard.

In his lucid exposition of the above thesis, Mr Knowles, who is also the Treasurer of IEC, takes note of the welcome trend in UK to start from an international recommendation (or draft) and to try to adopt this as a national standard with a minimum of variation. The author reviews steps being taken to put speed into the work of IEC with a view to expediting harmonization national standards—Ed.

■ A gradual change seems to be coming over the origination of electrical standards. A great many of our present British electrical standards have begun and still begin as a draft prepared by a BEAMA technical committee. Unlike its opposite number in the United States (NEMA), BEAMA has refrained from publishing the specifications which its technical committees have prepared. BEAMA has followed a consistent policy of forwarding the drafts to the British Standards Institution. After more committee work with representatives of both manufacturing and purchasing interests the result has been published by the BSI as a national standard.

There are, of course, other ways in which a British electrical standard or a revision of an existing standard has originated. A committee engaged on other standards may find an extension of its work desirable. There may be some purchasers' specifications which incite a proposal to bring them into common practice by establishing a national standard—and so on.

PRESSURE FOR HARMONISATION

In recent years there has been increasing interest in the standards of other countries. Differences between various national standards and the different safety requirements imposed by national testing authorities are obvious impediments to international trade in engineering products. The exporter's production is hampered if he has to modify his designs not only for export but for each country to which he wishes to export, since the overseas purchaser will want his supplier to comply with his particular national standards. Purchasers in the less industrialised countries, when buying equipment which is not manufactured in their own country, are widening their source of supply. Whose standards should they accept ?

All over the world, but particularly in Europe, the pressure for the greater harmonisation of national standards is increasing. The Common Market countries are under political pressure to harmonise their standards. The EFTA countries have taken increasing interest in such harmonisation. In the electrical industry this interest in the comparison of electrical standards in the 13 countries has been canalised into the organisation known as CENEL (European Electrical Standards Co-ordinating Committee) began as an ECM-EFTA steering committee which met in Milan in 1960. This meeting provided the opportunity for the Seven to find out what projects of harmonisation the Six had commenced (only then a very few). Progressively CENEL has established projects of harmonisation to be dealt with by the Thirteen as a whole.

The key documents from which Experts Groups of CENEL start their discussions may be the national standard of a particular country which has achieved wide acceptance, but normally such key documents are those of the CEE or the IEC, even though the Experts Group may agree a set of deviations from such key documents. Experience in CENEL Experts Groups has shown that in most cases the most fruitful starting point is an international document or draft rather than the particular standard of an individual European country. This is because some national differences will already have been ironed out in CEE or IEC discussions.

CEE (International Commission on Rules for Approval of Electrical

*Reproduced from Electrical Review, 176, 13; 1965; 482-484.

Equipment) is a regional body dealing with standardisation particularly in the interest of the safety of the public, and thus mainly concerned with equipment which is used in the home. This body originated through association between European testing and approval authorities; it now brings together all the interests concerned with standards for this sort of equipment in many European countries including the United Kingdom.

IEC (International Electrotechnical Commission) on the other hand is a world-wide organisation which has national committees in practically every country in the world that has a national standards organisation. It concerns itself chiefly with electrical components and products which are not sold to the general public but which form the whole or part of industrial electrical contracts.

Between them, therefore, the CEE and the IEC cover practically the whole field of domestic and industrial electrical products.

PERSONAL CONCERN WITH INTERNATIONAL WORK

So many of those who are active in producing or revising British standards have now taken part in international meetings of working groups or committees of IEC, CEE or CENEL, that it is not surprising that they are increasingly influencing their colleagues on British standardising committees to start any new draft of a British standard from an IEC or CEE document, rather than to compile or revise a British standard and afterwards see how this compares with other national standards.

There are, of course, many engineers serving on British standardising committees who are not personally concerned with exports and who have had little or no experience of international work. "British and Best" is a laudable tradition and there is a natural reluctance to alter British standards because some other countries have different ideas. It is usually after some hard experience or arguments in an international committee that one is driven to accept the fact that some other countries have good reasons for some of the differences between their standards and ours—at least for use in their own conditions. There is also, of course, some reverse action. Other countries have found that many requirements of British standards have a sound basis for safety and reliable performance. The cut and thrust of technical argument in international working groups and committees does resolve many questions, either into agreement or into agreement to differ because of different national circumstances—unresolved but defined differences. Harmonisation of national standards does not necessarily make them identical but does remove unnecessary differences and provide sound arguments for the differences that remain.

EXPORT COMPETITION

The need for British engineering practice and standards to be competitive in an international setting inclines British exporting manufacturers to press users' representatives on British standardising committees to accept in the home market more of the requirements which their overseas customers require, since separate requirements for home and overseas markets prevent the full benefits of standardised production being realised. The increasing efforts being made by the countries of the Common Market (who are themselves very concerned with exports) to have common standards has drawn British manufacturers more nearly towards the European standards with which Britain has to compete not only in European trade but in trade with the countries to which the Common Market countries themselves export. With domestic electrical manufacturers, the CEE, though a regional body, is a vital factor in standards for such manufacturers even outside its mainly European representation. With industrial electrical equipment the influence of the European members of the IEC increases as the harmonisation of European standards gathers momentum. More and more countries both outside and inside Europe are basing their standards for the electrical goods they wish to export—or to import—on the IEC recommendations.

The countries of the British Commonwealth have traditionally accepted British standards—and many of their own standard specifications have been based on the British approach. Nowadays, however, most Commonwealth countries would be happy to know that British standards were as close as possible to the IEC recommendations—to which still more importing countries are paying increasing attention. Even the South American states in their initial attempts at regional harmonisation of standards have expressed their intention of adopting IEC recommendations as the preferred basis (though only a few South American countries are members of the IEC).

The United States with its large home market and small proportion of export has more difficulty than Britain in moving towards standards based on the IEC recommendations. United States representatives on IEC committees do make a considerable contribution but they have more difficulty than British representatives in influencing any consequent change in their country's own specifications.

MANUFACTURERS AND USERS

It is normal for the delegates to international standardising committees and working groups of the IEC, CEE or CENEL to represent a mixture of manufacturers and users and officials of national standards organisations. The drafts and documents resulting from their deliberations, therefore, do not always reflect what the manufacturers would prefer from the point of view of their own production and technical staffs. The clash that sometimes occurs within a firm between what manufacturing engineers would prefer to produce and what users would prefer to buy can extend to international as well as to national discussions on standards. As, therefore, the starting point of a new or revised standard tends to shift from a draft prepared by manufacturers to a draft prepared by an international committee representing manufacturers and users in some parity of representation, the manufacturers tend to look across national boundaries for support and mutual assistance. This is not necessarily inconsistent with the manufactures' support of international recommendations on standards but manufacturers within each industrial country recognise that there is substantial purchasing power in the hands of users whose views on their own requirements are less restrained by export requirements. Nationalised industries might be criticised for requiring equipment which, in design and manufacture, is not competitive in export markets, though it must be conceded that nationalised industries do take a considerable part in international discussions (e.g. as far as electrical power interests are concerned, in World Power Conferences, CIGRE meetings and in IEC committees).

FEWER DIFFERENCES IN ELECTRONICS

Only in telecommunications and electronic equipment is there less

conflict between national and international standards. This is understandable since in this newer field of technology there are fewer differences of long standing than in the older electrical technologies. There are, of course, difficulties in getting international agreement in some fields of telecommunications and electronics—in some cases because even agreement within the same national boundary has not been reached—but the progress of international work in this field has been rapid in recent years. About a third of the IEC technical committees deal with components and equipment connected with telecommunications and electronics.

REDUCING DELAYS

The increasing emphasis on international trade and exports has intensified the desire for a speeding-up of standardising work, both nationally and internationally. It is not only in this country that there is a widespread desire to accelerate progress in bringing national engineering practice into accord with international engineering standards.

Some of the time taken in preparing an original draft for a national specification (a task for an individual or a small working group) is now saved by commencing with an international document—if this is available. The IEC Council, recognising that the work on national standards can be held up by delays in finalising its recommendations, has been reviewing its own procedures and some acceleration has been achieved. The number of publications the IEC issued from its Central Office in Geneva last year was nearly double the number issued in 1963. This more rapid increase has brought with it a need for national subscriptions to IEC to increase more than the previous average yearly increase of 18 percent. These national subscriptions are paid by or through national standards institutions in the 40 member countries, usually out of their general funds—which are frequently inadequate for their own national work. Such subscriptions, of course, represent only a small part of the cost of international work, the major part being the cost of sending delegates to meetings and the costs of secretarial work.

BRITISH CONTRIBUTION

Britain holds the secretariats (through the British Standards Institution) of more of the IEC committees and subcommittees than any other country—and also provides more chairmen of such committees, besides being a major purchaser of its publications. The chairmen and secretaries of international committees have to act impartially without specially favouring the opinions of their own national committees—sometimes an unenviable task. The rate of progress of international work depends very considerably on the competence of the chairman and the time the secretary can give to international as well as national work. The major part taken by the British electrical and electronic industries in IEC, CEE and CENEL work should be set off against the feelings in some quarters that Britain does not give enough attention to other countries' standards. Indeed, more than a third of the time of the staff of the BSI is devoted to international work—not only in the electrical field but in many other fields in the work of international harmonisation of standards. It is not surprising that the National Economic Development Council and its Little Neddies should be showing an increasing interest in the support given by both Government and industry to the international work of BSI.

COMPANY STANDARDIZATION SEMINARS 1966

■ To assist the industries in India to develop their company (in-plant) standardization practices, ISI, in collaboration with the National Productivity Council of India (NPC), has finalized plans for organizing three seminars at Bangalore, Baroda and Poona. As part of the programme of the India Productivity Year 1966, the seminars will provide detailed training in standardization methods and techniques covering theory as well as in-plant project work. Recognizing standardization as the keystone for all programmes for enhanced productivity, NPC has also instituted an award for in-plant standardization in connection with IPY 1966 programme.

Each of the three seminars will be in three parts. The first part 'Briefing Sessions' of five days' duration will provide instructions to the participants in the principles and techniques of company standardization.

During the second phase 'In-plant Survey', each participant would return to his company for conducting a survey of the status of in-plant standards activity in the organization and for carrying out detailed investigation on a selected project for development of one company standard or more. Based on the evidence collected, each participant would formulate his views on organized company standardization in his company in a draft report.

The draft reports of the participants will be discussed at the third part of the seminar 'Review Session' of three days' duration.

Dates and venues for the seminars are given below:

	Bangalore	*Baroda*	*Poona*
Briefing Session	21-25 March 66	11-15 July 66	29 August-2 September 66
In-plant Survey	28 March-26 April 66	18 July-16 August 66	5 September-4 October 66
Review Sessions	27-29 April 66	17-19 August 66	5-7 October 66

Participants in these seminars are expected to be technical personnel of mature judgement and experience who have worked effectively with people at different levels within the company. Mostly, they would be representatives of management, or heads of departments of planning, design, manufacture, inspection, quality control, store and industrial engineering who are in a position to realistically evaluate the existing status and future possibilities of standardization within their companies. The Local Productivity Councils in the respective regions are providing active assistance in the organization of these seminars.

Detailed information regarding the time schedule, fee, registration of participants to the respective seminars can be had from the Head, Implementation Department, Indian Standards Institution, Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi-1, and the offices of the respective Local Productivity Councils, at Bangalore, Baroda and Poona.

Standardization—A Dynamic Process*

■ It is indeed a pleasure to look forward to renewing my acquaintances in the United States of America and to acquiring a broader knowledge of industrial standardization for which your land is famous.

Belated as we may be in my country with regard to the establishment of an industrial society along the lines of yours, it could be that this might work to our advantage in many areas including standardization.

The establishment of India's independence brought to the fore a host of problems most of which we are still endeavouring to solve. I believe this is not too unlike other nations where problem solving is a projection of uninterrupted progress. The relative youth of our economy and the lack of any extensive technical and professional activities in India made it possible for the Indian Standards Institution to function with considerable authority from its outset.

I am aware that standards development work in your country is done largely by independent technical and professional societies, as well as trade associations and consumer groups, and also, that the government is rather active in developing standards. I understand that hundreds of authoritative groups representing different segments of the economy are constantly at work on the thousands of standards used nationally in the United States.

Most certainly, extensive debate can be organized along the lines of the relative merits of a centralized versus a decentralized system of standards development facilities. I have been advised that the whole concept of national standardization in your country is under careful scrutiny in terms of assuring yourself that a facility will be available to provide full standards co-ordination where needed by consumer, industry and government. I wish you well in these deliberations.

Without meaning to impose too much upon your time, I would like to say that in my own country we have unearthed sufficient evidence to indicate considerable skill in the development of standards some 5 000 years ago. This shows up in the excavations which have been made in the ruins of cities of the Indus Civilization. Foremost was the organization of a modular concept in the use of building materials and even to the layout of streets and public areas. This is what I believe you call modular co-ordination. Two cities, 700 miles apart, known as Mohenjo-Daro and Harappa, showed almost identical street layouts and public building designs as well as a commonly used brick modular measurement—$11 \times 5\frac{1}{2} \times 2\frac{1}{2}$ in. ($28 \times 14 \times 6$ cm).

Here we are, some millenia later, still aspiring to master the construction module, so that design and component will be blessed in a happy marriage. Perhaps this is again a fitting observation on the constant nature of standards themselves. I believe it is you Americans who have put forth the hypothesis that standards are a solution to recurring problems. Man's ability, in turn, to be cognizant of such problems and approach their solution in an organized manner is a valid hallmark of civilization.

In fact, as one reads history and acquaints oneself with the efforts of anthropologists and archaeologists, one becomes aware that every civilization worthy of the name has had substantial progress in standards of some sort. Certainly, the Chinese had some specifications for their fire-works as to colour, brilliance and even the bang. The same would be true of grading silk larvae. Ancient Greece yielded both to East and West a host of standards which were both aesthetic and practical. Their Ionic and Doric capitols still flourish on public buildings around the world.

All of which may be one way of saying that the work of standardization is, as I believe you put it, dynamic in its forward movement. As a matter of fact, when they are not needed, we get rid of them in India and I understand the same is true in your country. Mr Gay† informed me that so far this year, eleven American Standards have been withdrawn from their approval status simply because they no longer serve an economic purpose.

But where there are needs, we must continue to press ahead to achieve those economies available to us in standards.

I would now like to say a few words in connection with the Indian Standards Institution (ISI).

ISI was started immediately after independence in 1947 and was more or less based on the BSI organization in UK. Mr Percy Good, a former Director of BSI, and the present Director, Mr H. A. R. Binney, have given considerable help and advice to start up our organization.

It is young and vigorous organization which I have watched grow from its very birth and which I have seen take its place among Standards Institutions of the world under the dynamic and able leadership of Dr Lal C. Verman, who is well-known in USA, well-known to Mr Roger Gay and to ASA. Only last month he was invited by the United Nations as a Consultant to make suggestions for developing a UN plan of action for promoting industrial standardization in developing countries. He spent about a week here and has made a very valuable report.

Of course, as is usual in India, the staff of ISI is very large. They have several offices all over the Country. We are now expanding the facilities at the Centre and a new building is being constructed with laboratory facilities costing about one million dollars.

ISI has done considerable amount of work in standardization of steel sections in the steel industry. ISI also undertook a Steel Economy Programme and developed new sections of structural steel which have saved considerable amount of steel in its use. The Certification Marks Scheme which ISI has developed since August 1955 has also been welcomed by the steel industry in India.

* A text of speech delivered by Shri Jehangir J. Ghandy, President ISO, at a gathering of standards engineers in New York during his recent visit to the United States.

† Mr Roger E. Gay, Managing Director, American Standards Association (ASA).

Statistical Quality Control As an Aid to Conformance to Standards

(Miss) S. P. VASWANI
N. C. Corporation Pvt Ltd, Bombay

Quality cannot be inspected into a product; it has to be built into it. This well-known aphorism is illustrated here by some case studies and the author's experiences as a consultant in Statistical Quality Control. The best way to ensure conformity to standards, according to the author, is to avoid manufacture of 'off-limits' products. It is here that the SQC techniques have a vital role to play—Ed.

■ In an aircraft factory with very strict standards of inspection, it was a practice to carry out 100 percent inspection. A quality control engineer, with the help of sampling inspection, estimated that about 12 percent of the product passed as good was defective. Repeated 100 percent inspections were then made to check this result. It was found necessary to repeat 100 percent inspection eight times on the same lots before all defectives could be screened out. The proportion of defectives which had been passed as good by the first 100 percent inspection incidentally agreed with the estimate given by the quality control engineer. This instance points to the conclusion that laying down of standards alone does not ensure their conformance. The best way of doing so is to avoid the manufacture of 'off-limits' products, for inspection cannot always eliminate the risk of a bad lot passing out as good.

There is a common saying that 'quality cannot be inspected into a product; it must be built into the product'. For obtaining conformity with standards, one must start at the production stage—much earlier than the inspection stage—and ensure that the goods are manufactured to the required standards. For this purpose, statistical quality control (SQC) techniques have been found invaluable.

RAPID PROGRESS

The techniques of SQC had their beginnings about forty years ago when the American army was facing the problem of heavy rejection in helmets. It was realized that several helmets did not fit the heads of the American soldiers and had, therefore, to be rejected. The problem was solved by a young engineer, Dr Walter A. Shewhart who was working at the Bell Telephone Laboratory. The statistical law known as the 'normal distribution' came to his mind and he got the heads of about 1 000 soldiers measured soon after. These measurements when plotted in the form of a 'frequency distribution' closely approximated the 'normal distribution'. After this discovery, it was easy for the American army to manufacture helmets of the right proportions in different sizes, and thus rejections were practically eliminated.

Since then, many statistical techniques have been used to achieve intensive utilization of existing resources in industry, trade and administration. During the Second World War, the importance of SQC techniques was realized by several countries. Today, these techniques are being increasingly used in a number of western countries and in Japan. In fact, one of the major reasons for the improvement in the standard of the Japanese post-war products, has been the intensive use of SQC techniques in practically all fields of manufacture.

THE LAWS OF STATISTICS

A knowledge of the laws of statistics can help solve several difficulties that arise from time to time in manufacturing processes. Given a set of raw materials, labour, equipment and other resources, the techniques of SQC reduce the cost of manufacture and improve the quality of products. This becomes possible because with the help of these techniques, wastage, scrap and rework is reduced, thereby, maximizing the utilization of materials, expediting the flow of production and releasing

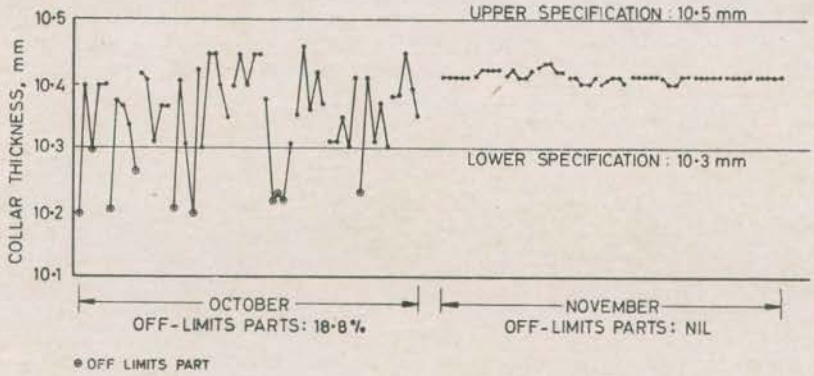

Fig. 1 Reduction in off-limits parts with SQC techniques

capital locked up in in-process stocks. Fig. 1 illustrates an application of these techniques.

In one precision component, SQC observations, started in October 1963, revealed that the existing tool arrangement was not adequate. The tooling was, therefore, changed in the subsequent month and this resulted in a significant reduction in the fluctuations of the dimension. The 'off-limits' parts in November were reduced to nil compared to 18·8 percent in October. Besides, the degree of homogeneity achieved was also very high in November, the actual variation being far less than even the specified tolerances. This improvement has now become a permanent feature of this product.

A high degree of precision and standardization has been obtained in all the workshops where these techniques were introduced. As a result, such controls have helped in reducing rework, scrap and wastage.

OPERATOR TRAINING

With the help of SQC techniques, operators are also being trained to produce good product. Some elementary principles of statistics are explained to them and efforts are made to make them quality-conscious. Appropriate charts are installed on the machines or at other suitable places. Such training has invariably resulted in significant improvement in the quality of work or product, combined with an increased rate of production. This is illustrated in the case of a machine shop in which eight operatives who were producing a large proportion of parts requiring rework were given training. After training, each one of them was able to reduce the incidence of parts requiring rework, the overall proportion having reduced from 25 percent in September-November 1957 to 2 percent in July 1958 (Fig. 2). As a result of these improvements, this component, which was previously running short in the assembly, became surplus, and eliminated completely the hold-ups in the assembly which had previously occurred due to its shortage. As the final machine was very costly, this improvement resulted in releasing considerable amount of capital which had been earlier locked up in in-process stocks. Further, although training was being imparted during the first shift only, these operatives continued to produce goods within the desired specifications even when they were working in the second shift. This indicated that quality consciousness had become part of their thinking.

Similar results have been obtained with several other operatives in various undertakings, where, long after the training, they have continued to produce quality products.

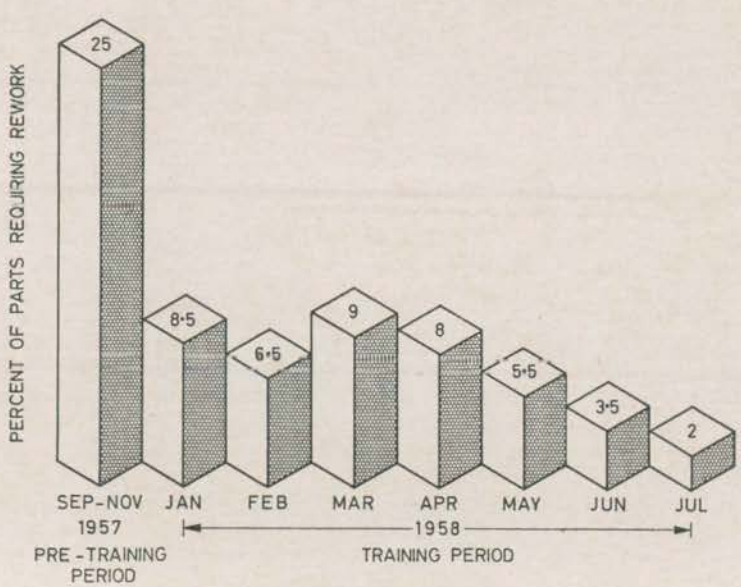

Fig. 2 Training of operatives with SQC techniques

SMALL-SCALE MANUFACTURE

Large scale manufacturing concerns generally purchase several materials from small-scale manufacturers. Often, considerable amount of machining work is done by small workshops for large undertakings as it is found to be more economical due to lower overheads. In such cases, adherence to standards is often lacking, as, many smaller manufacturers have neither the training nor the equipment to ensure the degree of precision required by the larger concerns. Sizable proportions of such products are often reworked, if not rejected, in the larger concerns before they can be utilized for final assemblies, with the incidental loss of machine hours, man hours and slower turnover, not to say of the risk of undesirable products going unnoticed in the final lots. In such cases, it has been found helpful to provide the smaller manufacturers with the technical know-how in addition to proper tools, templates, gauges, jigs, fixtures and other measuring and manufacturing equipment. Such help rendered to the small-scale industry is in the interest of the larger undertakings, as it avoids rejections and rework at their end. To quote an instance, during the course of SQC work in a foundry, it was noticed that a large proportion of defects in the castings of a pump could be traced to chaplets whose manufacture had been entrusted to a Ladies' Club in the town. A look at some lots of chaplets revealed complete lack of standardization in the item. After this finding, it was decided to provide a die along with the order of manufacture of the chaplets. Needless

to say that with improvement in chaplets, casting defects reduced significantly. There are manufacturing concerns in other countries which insists that they would buy parts from only those manufacturers who introduce statistical quality control methods in their manufacturing processes.

The problems of handling and packing, particularly for those products which are liable to get damaged, also merit greater attention than has been paid hitherto. For instance, in a textile mill making a heavy fabric, ever since indigenous yarn came to be used certain types of defects which marred the appearance of the fabric had increased considerably. When the mill, instead of buying the yarn from the market, arranged to get it directly from the manufacturers, thereby reducing the extent of handling, the appearance of the cloth immediately showed significant improvement. It is pertinent to note that imported yarn, in spite of much larger distances, had not been spoilt in transit.

USE OF SCARCE MATERIALS

Sometimes, because of scarcity of imported materials, several public and private undertakings build up large stocks of these items to last them several years. Some of these items are likely to become obsolete in course of time. At the same time, several factories may not be able to procure the scarce material so essential for their product. Here also, statistically controlled systems of inventory can be of considerable help. By following such methods, many undertakings have been able to release large amounts of locked up capital. If these techniques are utilized in a rational manner on a country wide scale, there is no doubt that import of several items can be reduced in keeping with the actual requirements, and release the foreign exchange available for the really useful items, which, in turn, would improve the quality of our exports.

SOLVENT EXTRACTION INDUSTRY IN INDIA

OTA seminar reviews technical and economic problems

■ A Seminar on 'Solvent Extraction Industry in India' was organized by the Bombay Branch of the Oil Technologists' Association of India (OTA) last January 1966 in Bombay in co-operation with Messrs De Smet (India) Private Ltd and Soybean Council of America, Inc. Participated by over 200 delegates from all parts of the country, the Seminar in its six technical sessions reviewed the progress of solvent extraction industry, and developments in the field. Among the subjects discussed were extraction characteristics of oil bearing materials, solvent for extraction and techno-economics of solvent extraction industry. Dr Sadgopal, Head, Chemical Department of ISI, presided over the Session on 'Solvent for Extraction'.

The solvent extraction industry has made rapid strides in the past few years. While in 1957 there were just a dozen working units in the country, today the number of solvent extraction plants is over a hundred. The major factors responsible for this rapid growth are establishment of facilities to fabricate the plants from substantially indigenous resources and price parity between expeller cake and deoiled cake coupled with ready export market for deoiled cake.

The industry has met with orthodox opposition on grounds of possible health hazards involved because of any carcinogenic solvent residues likely to be left over in the oil or the cake. It may, however, be mentioned that suitably processed solvent extracted oils and meals have been in use for edible purposes in almost all progressive countries of the world. Technical aspects necessary to safeguard health hazards involved in the use of the solvent-extracted oils and meals have received considerable attention from the Oils and Oilseeds Sectional Committee (CAFDC 5) and Animal Feeds Sectional Committee (AFDC 15) of ISI. The committees have gathered and developed considerable amount of scientific and technical data in respect of processing and quality control to ensure freedom of solvent extracted products from health hazards. It is heartening to note that the concerned authorities are getting convinced that stage has reached when the solvent extraction industry could be permitted to go ahead under necessary technical and regulatory controls to augment indigenous resources of edible oils and meals. It would also be pertinent to mention that the Ministry of Health has recently moved ISI to provide the necessary Indian Standards for the purpose of quality control of solvent-extracted oils and meals for edible purposes as well as a specification for the food-grade solvent hexane which alone can be permitted to be used for extraction purposes.

Estimation of CBR Value Using Plungers of Smaller Diameters

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For the design of flexible pavements and other field control work, in situ California Bearing Ratio (CBR) test has in recent years become one of the important routine tests in any highway construction project. The test, however, involves elaborate field arrangements, which are difficult to make at all places. Attempt has, therefore, been made at the Highways Research Station, Madras, to evolve a simple and satisfactory technique for finding the approximate CBR values involving the use of plungers, in place of cones—Ed.

■ The estimation of soil strength and behaviour of soils under stress are generally more complex than of any other material which a civil engineer has to deal with. Nevertheless, different methods have been developed for determining the strength properties of soils, of which bearing and penetration tests are simple and can be conducted easily. The main principle involved in the bearing and penetration tests is the application of compressive stress to the soil by a rigid bearing area and measurement of the resulting deflection or penetration for various loads. The difference between the two types of test is only a matter of scale. Penetration test is generally conducted on a smaller scale in the field or laboratory with test area of a few square inches, while the bearing test is conducted with larger plate areas. The penetration test is, therefore, considered simpler than the bearing test, and has been widely used both in laboratory testing and other field control works.

Among the important penetration tests commonly used are (a) the California Bearing Ratio (CBR) test, and (b) the North Dakota Cone test. The CBR test is conducted by causing a cylindrical plunger of 3 square-inch end cross section to penetrate the test block at the rate of 0·05 inch per minute, and measuring the load causing a penetration of 0·1 or 0·2 inch. On the other hand in the North Dakota Cone test, a cone with half angle of 7 degrees 45 minutes is used and the penetration of the cone plunger measured for load increments up to 80 pounds.

Of these two penetration tests, the CBR test has been generally used for the evaluation of the subgrade strength. Most of the state departments in our country and abroad adopt mainly this (CBR) method for the design of flexible pavements. In addition, this method is also recommended as an important field control test for all road construction works. Hence the estimation of the *in situ* CBR value both for the design of pavement and for other field control works has become one of the important routine in any highway construction project. But the determination of the CBR value in the field requires elaborate arrangement, such as reaction load which is usually a truck trailer or a laboratory van and a datum bar; it also requires strict control over the rate of application of the load. Such facilities, however, may not be available in all places and it may, therefore, be difficult to conduct the usual *in situ* CBR test. An attempt has, therefore, been made to evolve a simpler type of equipment and an easier method of testing in the field the CBR value approximately satisfactory for the purpose. This article deals with the instrumentation technique adopted, the method of test conducted, and the correlation between test results and actual CBR values suggested thereon.

1. TEST WITH NORTH DAKOTA CONE PENETROMETER

1.1 Initially, estimation of CBR value was tried using the North Dakota Cone apparatus mainly on account of its ease of handling and the simple method of testing involved. Similar study was also found to have been attempted by Alam Singh[1]. It was observed that the study made in that case related mainly to a particular soil and a correlation of CBR values and the *in situ* North Dakota Cone values have been obtained for different compactions. But in the present study a general correlation has been aimed at so as to cover different ranges of soils with widely varying CBR values.

1.2 Two identical test blocks were prepared for different ranges of soils in the CBR moulds and were kept soaked in water for four days. These test moulds were prepared at varying compactions for the different soils so that a wide range of values may be correlated. A total of about 40 sets of test specimen were thus prepared to obtain correlation between the CBR value and the cone bearing value. The moulds were removed from water and the CBR tests were conducted on one specimen of each set, while the cone bearing value was determined for the 80 pounds load on the second specimen. It was found that no satisfactory relation could be arrived for the values so obtained. This indicated that, though correlation was satisfactory for individual soils, a general correlation for a wide range of soils at different compactions would not be possible or accurate, the reliability of the North Dakota Cone test being generally restricted to clay soils. Probably the main reason was due to the difference in the shape of the CBR plunger which was a cylinder and that of the North Dakota Cone penetrometer (*see* Fig. 1), which was a cone. Another disadvantage in the North Dakota Cone test was that the presence of even a small pebble below the tip of the cone would make the results unreliable.

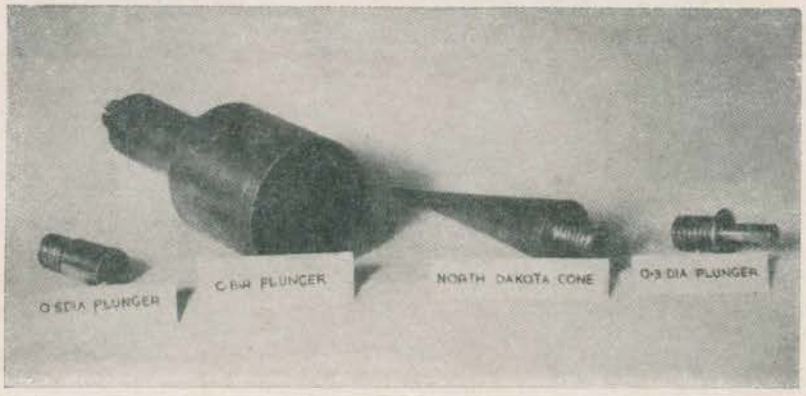

Fig. 1 Various plungers used in penetration test

2. TEST WITH SMALLER SIZE CYLINDRICAL PLUNGER

2.1 To overcome these difficulties, a correlation study was made with cylindrical plungers of smaller diameters, the main object being to have a geometrically similar plunger as that used for the standard CBR test which is also a cylinder (1·95 inch diameter) so as to obtain a better correlation. Here also it was found that such studies have already been made in Iowa State[2] aiming a correlation of the CBR and the Iowa Bearing Test which is somewhat similar to the CBR test. In this case, the specimen is compacted in a two-inch diameter mould and struck off to a height of two inches and a penetration rod of 5/8 inch diameter is used. This study, though, indicated a satisfactory correlation for soils with CBR value less than 10 percent, it was observed that for higher values a good correlation could not be obtained. This may be probably due to the use of single plunger for different soils with different ranges of CBR values and due to the side effect of mould, the mould being only of 2 inch diameter.

2.2 On these considerations, cylindrical plunger of different diameters ranging from 0·2 to 0·7 inch with an increment of 0·1 inch were used in the present study. Two sets of CBR test specimens were prepared as before (*see* 1.2) under identical conditions with different types of soils. Addition of different percentage of cement was also made in certain cases and the test specimens prepared with varying moisture content and with different compaction effect so as to obtain a high range of CBR values. By such combinations, test specimens could be prepared to cover a range of CBR even up to 70 percent. The important change made in this case was that the penetration of the plunger was measured vary precisely by a dial gauge to read an accuracy of 0·000 1 inch, replacing the scale and pointer attachment originally fixed in the North Dakota Penetrometer. The set up of the equipment used is shown in Fig. 2.

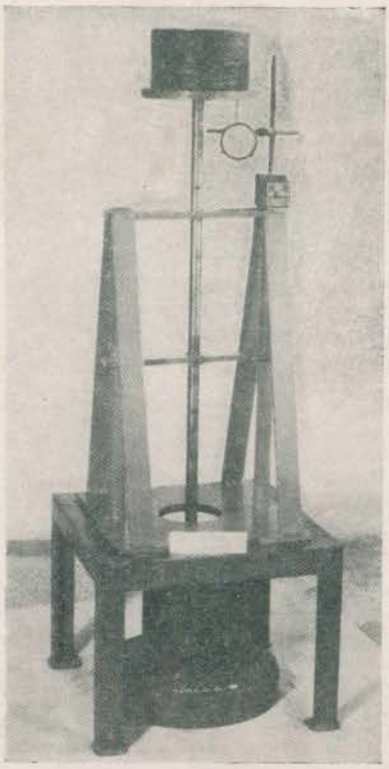

Fig. 2 Penetration test apparatus

3. DETAILS OF TESTS WITH PLUNGERS SMALLER THAN 1·95 INCH DIAMETER

3.1 For conducting the penetration test the desired size of plunger was fixed to the penetration test equipment and made to rest perfectly on the sample, the pointer of the dial gauge being adjusted to read zero. The loads were applied on the top of the platform of the apparatus, commencing with a load of 10 pounds, up to 100 pounds in increment of 10 pounds. Each load was retained for 3 minutes and the penetration of the plunger in the dial gauge was noted for the corresponding load added. However, addition of load was discontinued when the penetration of the plunger exceeded 0·5 inch or when a failure point was reached even with a lower load. This time limit of 3 minutes was based on a number of trial tests conducted with a view to completing the tests in a reasonable time without ignoring the total penetration value. As regards CBR test, it was conducted on the other set of specimen as per the standard procedure[7]. From the results obtained, separate graphs were drawn for plungers of different diameters giving the plunger penetration values along the X-axis and the load added along the Y-axis. The

corresponding CBR values as obtained from the standard tests are also noted against each line (Fig. 3 and 4)

4. DISCUSSION

4.1 From the various tests conducted it is found that the 0·6 inch and 0·7 inch diameter plungers could not be used for correlation studies since no appreciable penetration could be recorded even under 100 pounds load. On the other hand, in the case of 0·2 inch diameter plunger the results are liable to be very much affected even for the presence of small pebbles. The results obtained by the use of 0·3, 0·4 and 0·5 inches diameter plungers showed a gradation without much difference when a comparative study was made. Hence 0·3 and 0·5 inch diameter plungers were chosen, omitting 0·4 inch diameter plunger to get distinctly different values. The load settlement graphs were plotted separately for different sizes of plungers and from the various graphs thus obtained it was found that a satisfactory correlation could be established using the 0·5 inch diameter plunger for CBR values less than 17 percent while the 0·3 inch diameter plunger could be successfully adopted for CBR values over 10 percent. In general, it may be seen (Fig. 3 and 4) that as the slope of the curve increases, the CBR value also increases. Further, it may also be noted that these curves are similar in pattern to those of the standard CBR curves (Fig. 5) except that the slopes of curves of a particular CBR value in Fig. 3, 4 and 5 are different, probably due to the difference in sizes (0·3, 0·5 and 1·95 inch diameter) of the plungers used. This indicates that the two sets of graphs for 0·5 inch plunger and 0·3 inch plunger can be utilized advantageously for estimating the approximate CBR values in the field. It may, however, be observed that the different curves obtained for the varying CBR values are overlapping in the beginning under smaller loads probably due to surface irregularities. Similarly, for higher loads also some of the curves were found dropping at the end, mostly due to progressive

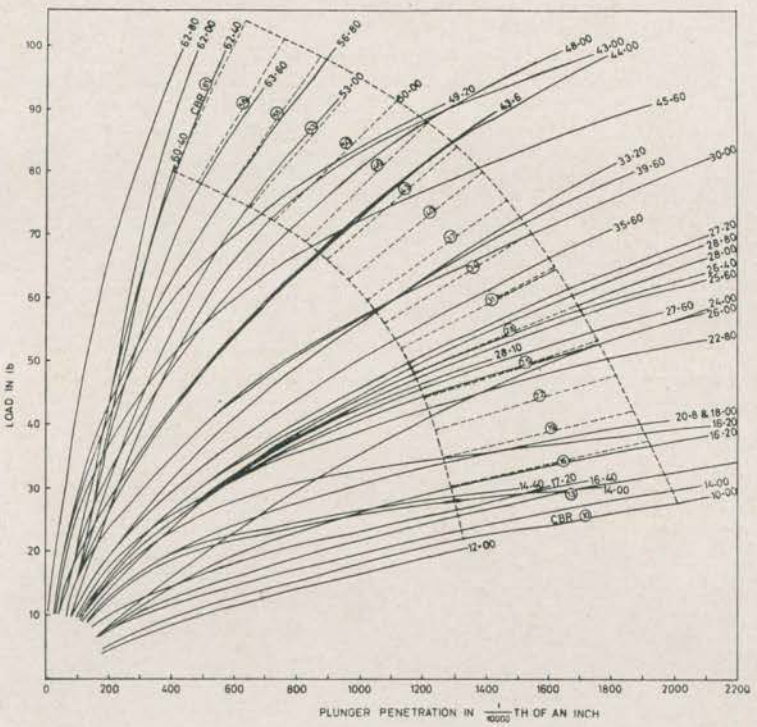

Fig. 3 Load penetration graph for 0·3 inch diameter plunger

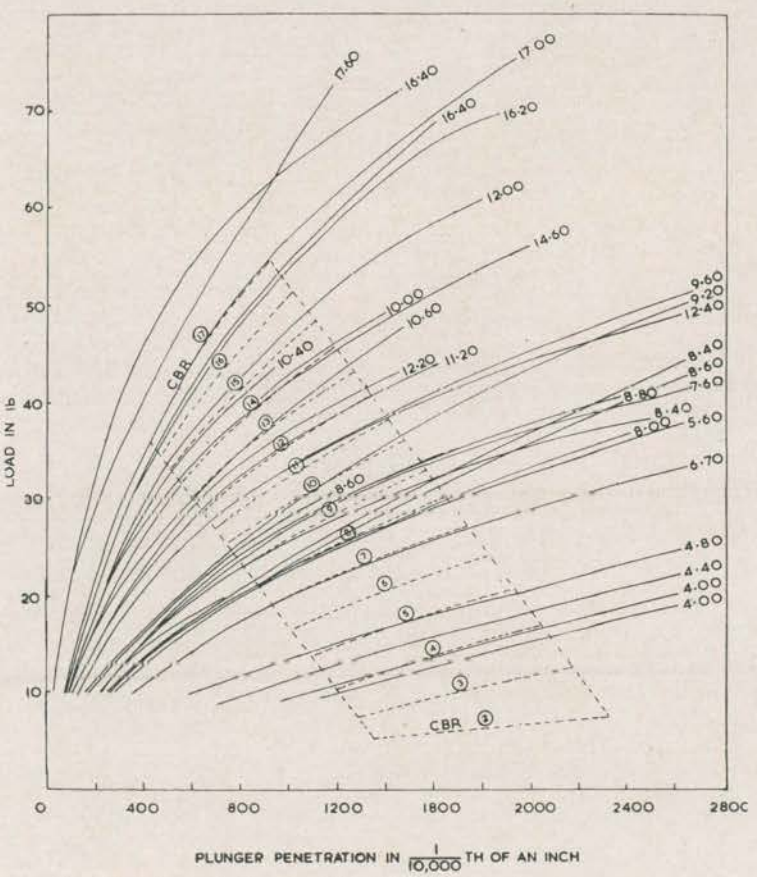

Fig. 4 Load penetration graph for 0·5 inch diameter plunger

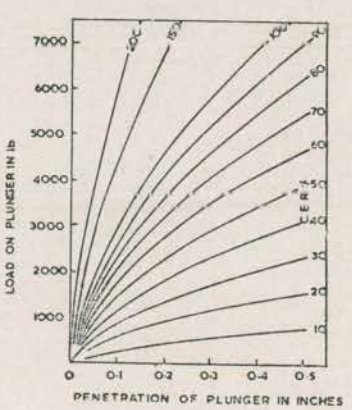

Fig. 5 Standard CBR Curve

shear failure at greater penetrations. This indicates that the pattern of load penetration graphs obtained in the central range can be relied more accurately for estimating the CBR values. On this consideration, the central recommended zones for the two sets of graphs have been defined by two dotted lines so as to present the average influence value. The final recommended graphs to be adopted for the two plungers are given in Fig. 6 and 7.

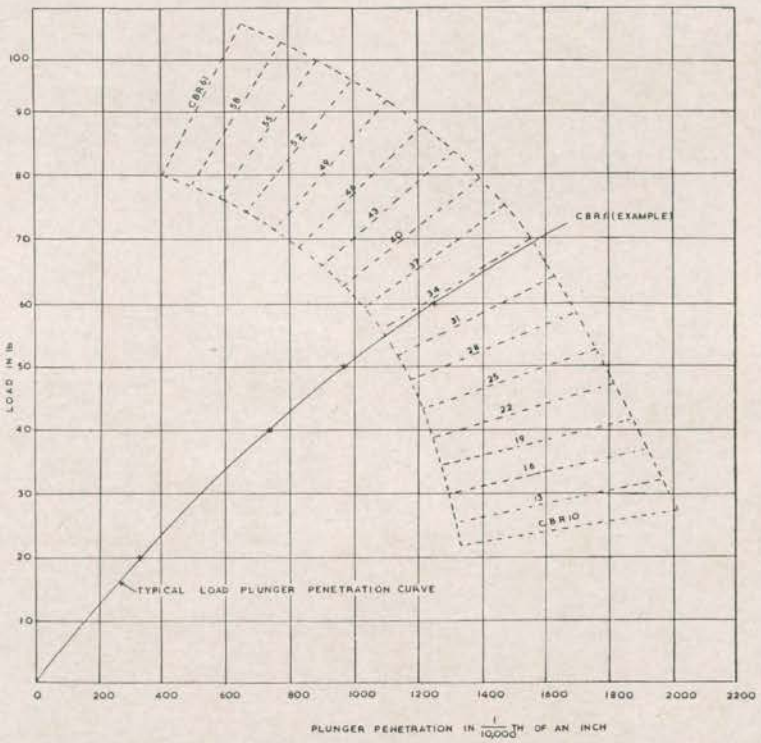

Fig. 6 Recommended graph for 0·3 inch diameter plunger for soils with CBR above 10

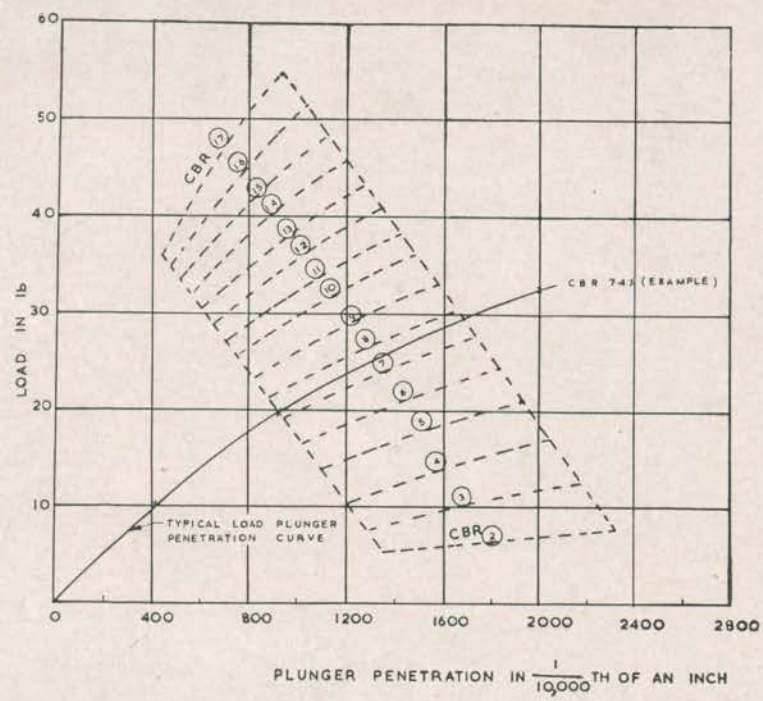

Fig. 7 Recommended graph for 0·5 inch diameter plunger for soils with CBR below 17

4.2 If the CBR value of any sample is to be determined the suitable size of plunger (0·3 inch or 0·5 inch diameter) is to be selected on consideration of the approximate CBR value of the soil to be tested. The plunger penetration test is then conducted and the load penetration value thus obtained is plotted on the corresponding graph of the particular plunger used. The CBR of the soil tested will be interpolated from the CBR value of the adjoining curves. The complete procedure for field tests and method of estimation are described fully in Appendix A.

5. FIELD TESTS

5.1 For checking the validity of the graphs thus obtained a number of tests were also conducted in the field on different types of soil layers. On all the sites, both the *in situ* CBR test and the plunger penetration test were conducted under identical conditions and at very close places to avoid any error due to change in soil conditions. The field CBR test was conducted as per the standard procedure while plunger penetration test was carried out as explained in the Appendix A. From the load penetration values thus obtained, the approximate CBR value of the layer tested was read from graphs and compared with the actual *in situ* CBR values obtained. These results are given in Table 1, and it may be seen that the variation between the two values in most cases is within a reasonable allowable margin. It confirms, therefore, that the set of curves evolved can be used satisfactorily for estimating the *in situ* CBR values from the plunger penetration tests using plunger of 0·3 inch or 0·5 inch diameter, as the case may be.

6. CONCLUSIONS

6.1 From the above investigations, it is obvious that the *in situ* CBR value can be estimated to a satisfactory approximation by conducting the plunger penetration tests using 0·3 inch diameter size plunger in case of soils with CBR values over 10 percent and using 0·5 inch diameter plunger, in case of soils with CBR less than 17 percent.

For soils with CBR values between 10 and 17, either of the two plungers can be used since both are found to give satisfactory values.

6.2 The estimation of the CBR value

TABLE 1 COMPARISON OF *IN SITU* CBR VALUES WITH THE CBR VALUES ESTIMATED FROM PLUNGER PENETRATION TEST

Sl No.	Diameter of Plunger Used (inch)	Type of Soil Tested	*In Situ* CBR Values, Percent	Estimated CBR Value From Plunger Penetration Test, Percent
1	0·5	Sandy clay	8·1	6
2	0·5	Sandy clay	5·6	5·5
3	0·5	Sand plus cement layer	14·92	14·3
4	0·5	Sand plus gravel plus coarse gravel layer	10·56	6·3
5	0·5	Sand plus gravel plus coarse gravel layer	11·44	16·7
6	0·3	Soil plus cement layer	50	61
7	0·3	Soil plus cement layer	61·6	61

using smaller size plunger will be very accurate particularly for all the fine grained soils, such as sandy clay, clay and soil cement or soil lime, and stabilized bases, but may sometime give varying values in cases of coarse grained gravely soils. In such cases a better approximation may be obtained from the average of a number of tests conducted very close to each other.

6.3 It may also be concluded that this attempt was made only to obtain a rough estimation of the CBR value from a simpler test and one should be cautious of the various shortcomings mentioned in using such test values. Hence, in those cases where very accurate test results are required it is recommended that in addition to these penetration tests, the standard CBR tests should also be conducted in a few cases and checked with the values estimated.

7. ACKNOWLEDGEMENTS

7.1 The work described in this paper was taken up under the Research Scheme of the Soils Division of the Highways Research Station and thanks are due to Sri J. Siddharthan, Research Assistant, for his help in conducting the various tests.

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APPENDIX A

TEST PROCEDURE FOR THE PLUNGER PENETRATION TEST

A-1. This methodi s intended to estimate the CBR value using either 0·3 inch diameter or 0·5 inch diameter plungers as the case may be.

A-2. APPARATUS

Details of the apparatus are given in Fig. 2.

A-3. PROCEDURE

1. Make the surface (on which the test is to be conducted) clean, smooth and level it for a minimum area of 2×2 ft.
2. Place the North Dakota Cone apparatus (without scale mounting and cone) over the surface and attach either 0·3 inch diameter or 0·5 inch diameter plunger as the case may be (0·5 inch diameter plunger roughly for soils with CBR values below 17 percent, and 0·3 inch diameter roughly for soils with CBR values above 10 percent).
3. Place a magnetic dial base over the top of the frame and attach a dial gauge (0·000 1 inch accuracy) to it.
4. Allow the plunger slowly to rest over the surface; take care to see that the bottom of plunger is resting perfectly over the soil surface.
5. Set the dial gauge vertically, so that the spindle of the gauge presses the bottom of the loading base of the apparatus.
6. Now allow 10 pounds weight to act freely over the plunger (care to be taken to see that the locker of the main spindle is in its loosened position) and start a stopwatch. The load should be placed as gently as possible avoiding any possibility for impact. After every 3 minutes note down the penetration, increasing the load up to a maximum of 100 pounds, or roughly to 0·5 inch penetration, whichever is quicker.
7. Enter the plunger penetration readings in Fig. 6 or 7 as the case may be and read the CBR value of the graph obtained by interpolating from the CBR values of zonal boundaries.

Steel Standardization

Effect on cost of construction

K. G. BERGH
Domnarfvets Steel Works
&
E. ULLMANN
Swedish Standards Institution

It is not always by use of low cost materials that construction economies can be achieved. The result may well be brought about by using standard grades of material even though it may be costlier. In Sweden this has been achieved by using structural steels with higher yield stresses and with chemical compositions which satisfy the demands of modern welding techniques.

The author, who represented Sweden at the last meeting of the Technical Committee of ISO for Steel (ISO/TC 17) held in New Delhi describes in this article how steel standardization in Sweden has helped the designers to build structures economically by using costlier high quality steels.—Ed.

■ Serious discussions are being held at present in practically all European countries regarding specifications for structural steels. Due to the fast development of steel making processes many countries are revising their national standards for these steels. International organizations are also highly active. The International Institute of Welding (IIW), for instance, has worked out their Recommendation 22-59 for classification of weldable steels in classes A, B, C and D with different properties. The countries within the Coal and Steel Community are working out Euronorm 25/28 for structural steels. The International Organization for Standardization (ISO) also has Taechnical Committee (TC17) for dealing with standardization in steel.

ECONOMY IN STEEL STRUCTURES

Steel often accounts for as much as 50 percent of the total cost of the structure. Cutting down the steel cost, therefore pays, but this does not mean that the cheapest material always gives the cheapest structure. One can often produce a product at a lower cost using a more expensive material. For instance, a structural steel with a higher yield point will allow the designer to make use of higher stresses and, therefore, to build lighter, material saving constructions. If, at the same time, the chemical composition of the material is adapted for welding by restricting the carbon content, one may increase the price of the steel but at the same time make it possible to build a less expensive construction.

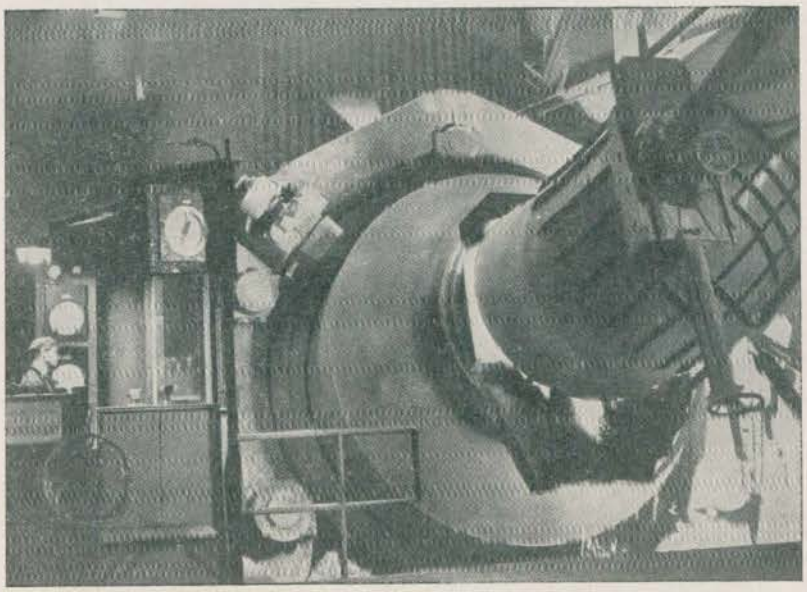
In Sweden, for example, a number of structural steels have been standardized with high yield stresses and with chemical compositions suitable for welded constructions. These steels are not the cheapest but they are made to fulfil the demands of the steel building and mechanical engineering industries for economical steels. These steels have higher guaranteed yield stresses and better weldability properties than the steels in the corresponding continental standards and international proposals.

CLASSIFICATION OF STRUCTURAL STEEL

Structural steels, that is, steels for use in bridges, buildings, cranes and so on, and primarily in welded constructions may be mainly classified according to the tensile strength and the weldability. All attempts to classify steels have, therefore, started with gradation on the basis of tensile strength and quality. This has resulted in a chess-board in which one can place a number of steels capable of covering all the main requirements. Such a scheme could for instance be as shown in Table 1.

TABLE 1 CLASSIFICATION OF STEEL

Tensile Strength *kgf/mm²*	Quality Class *A*	*B*	*C*	*D*
37—45	×	×	×	
44—52		×	×	×
50—60		×	×	×



A Kaldo furnace for production of steel

It should be observed from this Table that it is not necessary to fill all the entries by a steel grade. On the contrary there is a need for reducing the number of grades and it is preferable that only those grades are chosen which are likely to be used in large quantities. This reduction in the number of grades always gives longer production series, shorter delivery times and smaller stock, thus ensuring lower costs for the producer as well as the consumer. Although difficult to achieve reduction, this is also necessary because modern development in design requires steel grades both for simple and low-cost jobs, and for very complicated and costly purposes.

In structural steels it is in fact the yield stress which is of greater interest for the designer although steels have so far been classified according to their tensile strength. The tensile strength classes should be equally spread over the range in order to cover the demands from the consumers in the best way. Therefore, in Sweden the ranges of 37—45, 44—52 and 50—60 kgf/mm² have been chosen. From Fig. 1, it will be seen that these ranges are equally spread and also give a reasonable amount of overlapping. It should be noticed that the continental steel class 42—50 kgf/mm² lies too close to the 37—45 kgf/mm² steel and too far from the 52—62 kgf/mm² steel. Thus to serve in a practical way, Sweden, contrary to the continental practice, has for a long time used the 44 kgf/mm² steels. In fact, most of the 37 kgf/mm² steels will cover the demands of 42 kgf/mm² steel because of the large amount of overlapping. In the highest tensile class Sweden has preferred a steel with 50—60 kgf/mm² tensile strength, which is somewhat softer than the 52 kgf/mm² class, which is generally used by continental countries. This is done because of the better weldability properties obtainable with this steel and it being more economical for the final product to have a somewhat softer steel which can be more easily welded in complicated constructions.

All these steels have one thing in common which makes them different from the continental steels, namely, the guaranteed higher yield stresses (*see* Fig. 2).

The Swedish National Road Board has made a case study, showing the difference between steel weights in a certain bridge constructed in different steels with different yield stresses and tensile strengths. As can be expected, the highest yield stress and tensile strength will give the lightest and, therefore, the cheapest bridge and the cost saving is appreciable. Total costs vary by 24 percent when 50 kgf/mm² steel is used against 37 kgf/mm² steel. Hence one should prefer 44 kgf/mm² steel instead of 42 kgf/mm² steel and 50 kgf/mm² steel instead of 44 kgf/mm² steel. However, there are other problems which have to be taken into

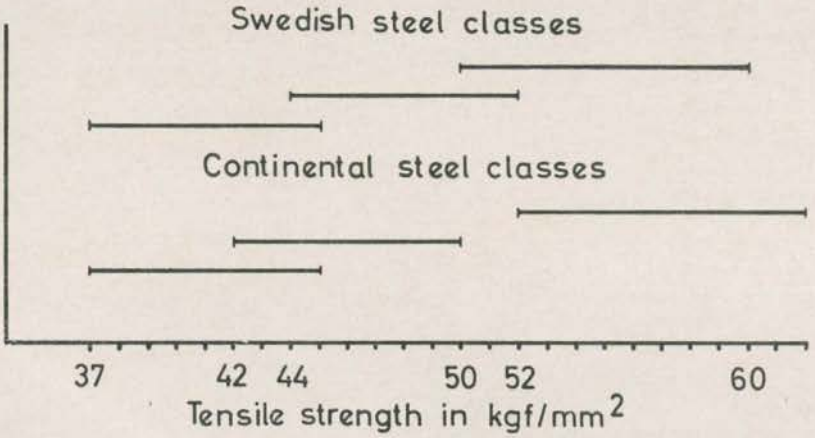


Fig. 1 Tensile strength of Continental and Swedish steels

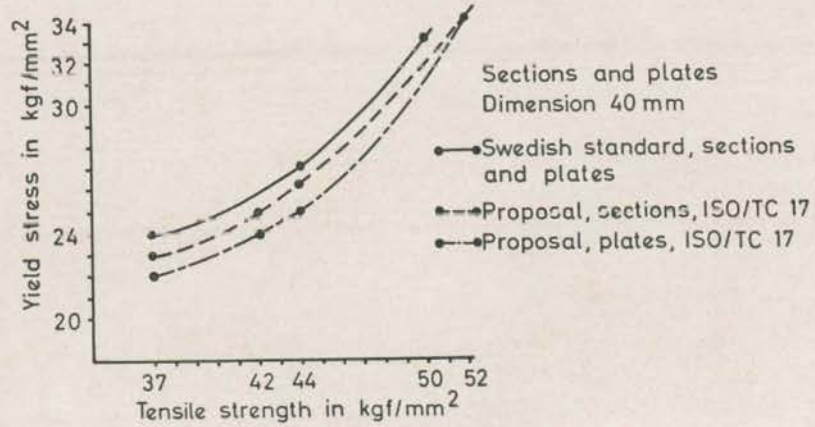


Fig. 2 Steel standards in Sweden prescribe higher yield stressess

consideration, that is, weldability and elasticity. When welding 50 kgf/mm² steel in large dimensions, one may have to pre-heat before welding. The total cost may be lower when using a 44 kgf/mm² steel which needs no pre-heating; therefore, the 44 kgf/mm² steel has been the most used steel for bridges in Sweden. On the other hand, the harder steel will give smaller dimensions, reducing the demand for pre-heating (*see* Fig. 3).

QUALITY CLASSES ACCORDING TO WELDABILITY

According to the IIW Recommendation the steels should be graded in four quality classes A, B, C and D; A class is permitted to be manufactured as rimming, semi-killed (balanced) or killed steels, while the B, C and D classes contain only killed or semi-killed steels. The C class should furthermore have a notch impact strength of 2·8 kgf·m as the lowest mean value when tested at 0°C, and the D class should meet an impact testing value of 2·8 kgf·m as mean value when tested at −20°C. These quality classes are very suitable and appear to be accepted in many countries.

CHEMICAL COMPOSITION

Steels suitable for welding, especially welding in modern form, on complex and highly stressed constructions, demand very strict chemical compositions. Too high impurities in steel are not allowed. The carbon content should be kept low and the tensile properties should be met by a higher manganese level and killed or semi-killed (balanced) steels are preferable. If these properties are to be met, a more expensive steel is required than the corresponding steels standardized some years ago. However, in general, money saving could be effected by changing to steels of higher qualities because the completed construction will be cheaper, allowing use of technical developments in this field. The new steel making processes, such as LD, Kaldo and other oxygen processes, give a better material than the ordinary Thomas process widely used some years ago. In Table 2 are given figures for the chemical compositions of some structural steels adapted for modern welding.

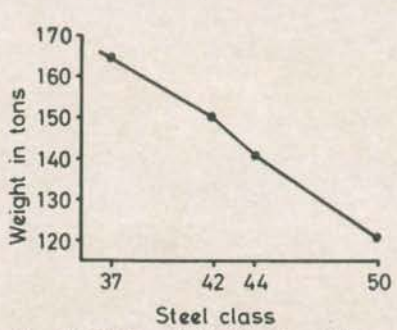
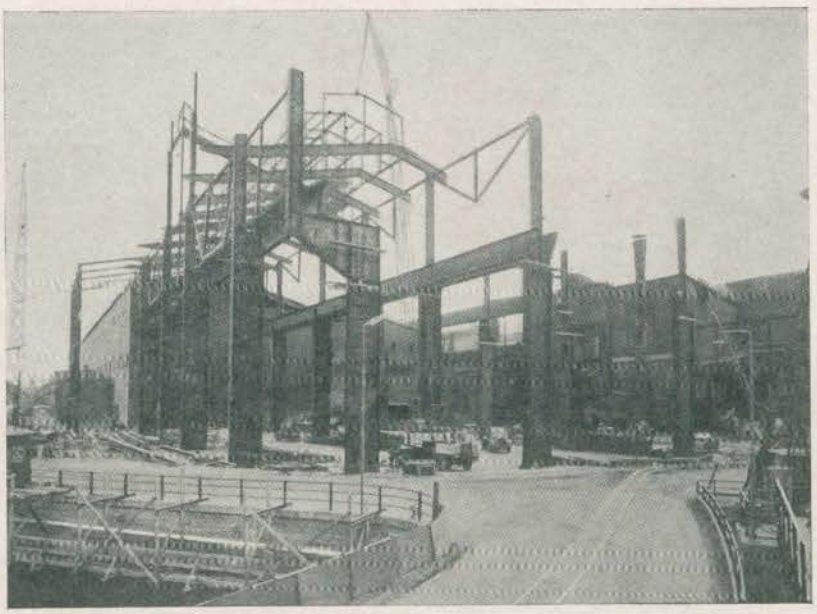


Fig. 3 Weight of Bridge in different steel grades but with the same overall strength



Fabrication of constructions in Sweden with steel structures with higher yield stresses

CONCLUSION

Thus the use of structural steels with higher yield stresses and with chemical composition which satisfy the demands of modern welding technique produces the less expensive constructions. Hence the consumer, when ordering steel, should analyse his problem not in order to get the cheapest steel but in order to get the cheapest product from a technical and economic consideration.

Because of rapid advances in science and engineering, there is also an urgent need for faster international work in the field of steel standards. While the current discussions centre on carbon steels and carbon-manganese steels, new improved steels made with fine-grain practice or with small amounts of alloying elements are entering the market.

International work on specifications for structural steels should take this into consideration thus making it possible for steel consumers to make use of the progress made in the last few years in the field of steel making, welding and designing and thereby leading to more economical steel constructions and facilitate steel trade.

TABLE 2 CHEMICAL COMPOSITIONS OF SOME STRUCTURAL STEELS

Tensile Strength kgf/mm²	Grade	Ladle analysis, Percentage Content							
		C *Max*	Si *Max*	Mn *Max*	P *Max*	S *Max*	Cr *Max*	Cu *Max*	N* *Max*
37—45	A	—	—	—	0·08	0·06	—	—	—
37—45	B	0·20	—	—	0·06	0·05	—	—	0·009
37—45	C	0·20	—	—	0·06	0·05	—	—	0·009
44—52	B	0·22	0·5	—	0·06	0·05	0·3	0·4	0·009
44—52	C	0·20	0·5	—	0·05	0·05	0·3	0·4	0·009
44—52	D	0·18	0·5	—	0·04	0·04	0·3	0·4	0·009
50—60	B	0·20	0·5	—	0·05	0·05	0·3	0·4	0·009
50—60	C	0·18†	0·5	1·8†	0·05	0·05	0·3	0·4	0·009
50—60	D	0·18†	0·5	1·8†	0·04	0·04	0·2	0·3	0·009

*for steel treated with N-binding elements, a higher value is allowed

†but $C + \frac{1}{10} Mn \leq 0{\cdot}32$

STANDARDS NEWS

NATIONAL SAFETY COUNCIL TO BE SET UP

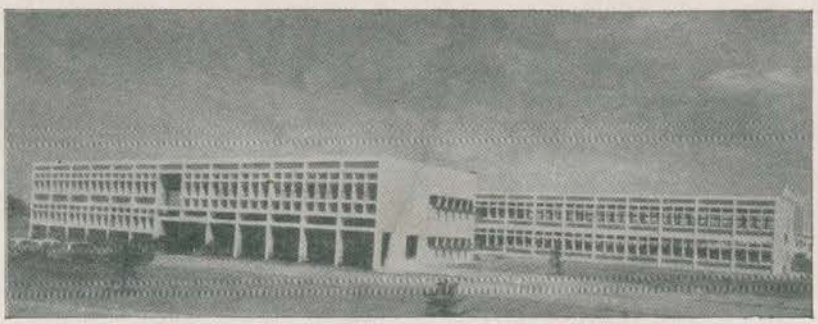
Aimed at making recommendations for preventing accidents, increasing productivity and promoting the general well-being of the industrial worker, the President's Conference on Industrial Safety, convened by the Union Ministry of Labour and Employment, met recently in New Delhi and unanimously resolved to establish a National Safety Council at the centre, assisted by similar safety councils at the State level. The Councils are to be autonomous and tripartite in composition.

Over 500 delegates drawn from the Government, industry and labour participated in the Conference. President Radhakrishnan, in his inaugural speech, pleaded for an integration between the management and labour to settle all disputes and to encourage education in industrial safety to prevent accidents. Shri H. K. S. Lindsay, President of the Associated Chambers of Commerce and Industry, who addressed the Conference, emphasized the need for evolving codes of safe practice and organizing training programmes for supervisors and labourers in all industrial establishments. Dr A. K. Gupta and Shri M. V. Patankar represented ISI at the Conference and contributed a paper entitled 'Safety through standards'. The Indian Standards Institution has, for a long time, been giving attention to industrial safety problems. A number of standards have already been published on (a) safety of equipment, (b) safety of operation and maintenance, (c) fire fighting equipment, (d) safety in welding, (e) fire safety in buildings, (f) structural safety, (g) safety in construction, and (h) safety of personnel. Many more under all these categories are in process. Recognizing the importance of industrial safety in the country's economy, ISI has set up an Industrial Safety Advisory Committee. The Committee, which consists of representatives from organizations interested in industrial safety, tenders advice in relation to co-ordination, execution and implementation of the work of various technical divisions of ISI in the field of industrial safety and in the task of standardization in the general field of safety on subjects which could not be covered by the existing departments of ISI.

Shri D. Sanjivayya, Union Minister for Labour and Employment assured the conference of Government's utmost assistance in completing the speedy establishment of the National Safety Council.

CENTRAL MACHINE TOOL INSTITUTE

To undertake design and development of machine tools and the research activity necessary to maintain standards in Indian industry, the Union Government established recently the Central



The workshop and the main building of CMTI, Bangalore

Dr T. N. Singh, former President of ISI and Minister of Industries, inspects a prototype of a drilling machine designed and developed at CMTI, Bangalore

Machine Tool Institute (CMTI) at Bangalore with the assistance of the Government of the Czechoslovak Socialist Republic. The institute fulfils a distinct and pioneering role in designing mother-machines. CMTI has already initiated studies in certain advanced fields of production technology, such as machineability of metals, group technology and typification of machine tools and toolings. The results of these studies are expected to have a far-reaching impact on productivity of machine tools and engineering industry.

Dr T. N. Singh, who inaugurated the Institute last December, said that it was not only basically connected with machinery but was also a seat of learning and research and would go a long way towards helping the country in its effort to become self-reliant in all fields.

To mark the inaugural function, CMTI released a souvenier carrying articles concerning 'Standardization and typification in machine tools', 'Testing and research in machine tool development', 'Automation in universal machine tools', etc.

IEMA OUTLINES FUTURE PROGRAMME

Inaugurating the eighteenth annual general meeting of the Indian Electrical Manufacturers Association (IEMA) held recently at New Delhi, Shri Asoka Mehta dealt with the difficult situation in the electrical manufacturing industry arising from acute shortage of materials. Shri P. R. Deshpande, Chairman of the Association, referring to the Government plans to increase the country's generating capacity by 100 percent (from 10 to 20 million kW) in the next five years, said that it would be an enormous problem to feed the industry with the raw materials required. The present output of the electrical manufacturing industries will have to increase from Rs 2 500 million to over Rs 6 000 million annually by 1970-71. The industry was also largely dependent on imports for copper, aluminium, lead, zinc, etc. IEMA proposed to solve this problem by conserving raw materials both imported and indigenous. The Chairman pleaded for active Government support by way of a vigorous public sector drive for exploring and exploiting deposits of non-ferrous metals and planning for the manufacture of cold-rolled electrical steel sheets.

TARIFF PROTECTION CONTINUED TO ALUMINIUM—WITHDRAWN FOR FIVE OTHER INDUSTRIES

From January 1966, calcium carbide, titanium dioxide caustic soda, ball bearings and soda ash industries have ceased to enjoy tariff protection. Having regard to the progress these industries have shown and the absence of any unhealthy competition from imports because of restrictions, the

Shri Asoka Mehta, Planning Minister, former Deputy Chairman of the Planning Commission, inaugurated the eighteenth annual general meeting of the IEMA held recently in New Delhi

Delegates participating at the eighteenth annual meeting of IEMA. Seated third from left in the second row is Dr Lal C. Verman, Director ISI

Union Government decided to discontinue protection to these industries.

The Tariff Commission, had recommended continuance of protection to these industries beyond 31 December 1965. The Government allowed, however, the rates of duty as were in existence, in respect of all these industries, to continue even after deprotection. The Commission noted that ISI had formulated specifications for all these materials and these were being implemented by the concerned industries in their production programmes. ISI has also amended and revised these specifications from time to time to keep them up-to-date by taking into account the progress made by the industry.

In the case of aluminium industry, the Union Government has decided to continue the protection for a further period ending 31 December 1968, in accordance with the Tariff Commission's recommendation.

The Commission, in its report, has commended the installation of quality control equipment and laboratories by this comparatively new industry and has noted with satisfaction the high standard of quality of the fabricated products and alloys. Mention has also been made of the standard specifications evolved by ISI for aluminium alloy ingots, bars, sheets, circles and strips, and aluminium foils.

METAL TESTING EUIPMENT

The production of two testing machines, namely, Rockwell Hardness Tester and Relief Grinding Fixture, the former designed to measure the hardness of metals and alloys of all types and sizes and the latter to grind reliefs on cutting tools like taps, drills and countersinks, has been undertaken by a firm in Maharashtra.

The Rockwell Hardness Tester contains 98 percent indigenous parts. Large scale manufacture of this machine is expected to relieve pressure on its import.

The firm also manufactures a dynamic balancing machine, useful for balancing the rotors of electric motors, fans, crank shafts, fly-wheels, etc. This machine is expected to measure vibrations as small as ten millionth of an inch.

COMPULSORY QUALITY CONTROL ON MINERALS AND ORES, COIR MATS

Export of iron ore, manganese ore, ferro-manganese, bauxite, chrome ore, kyanite, sillimanite, zinc, magnesite, barytes, red oxide and yellow ochre has been brought under compulsory pre-shipment inspection from 1 January 1966. Pre-shipment inspection, which was hitherto voluntary in this trade, has now been entrusted to recognized agencies under the *Quality Control and Inspection Act, 1963.*

To ensure quality of coir mats for export, Government have introduced compulsory pre-shipment inspection in respect of this commodity also. For this purpose, the Indian Standards IS : 1858-1964 and IS : 1693-1964 for coir door mats, and IS : 2331-1963 for coir mattings, mourzouks and carpets have been recognized by the Government as standard specifications for coir door mats or, as the case may be, coir mattings, mourzouks and carpets.

Centres in Kerala (Alleppey, Cochin and Shertallia) as well as Madras, Bombay and Calcutta have been set up to carry out pre-shipment inspection of coir mats meant for export.

NEW STANDARDS SET UP FOR NEW ZEALAND

Under the *1965 Standards Act*, passed by the New Zealand Parliament at its last session, a new Standards Council and Standards Association of New Zealand will take over from 1 April 1966 the thirty-year old New Zealand Standards Institute which has hitherto been an Institution owned and financed by the Government. The new Council as well as the Association, which will get the funds from private sources, such as subscriptions, donations, fees, Government grants and sale of publications, will have an independent existence.

APO DELEGATES VISIT ISI

A party of delegates participating in the Sixth Governing Body meeting of the Asian Productivity Organization (APO), recently held in New Delhi visited the Indian Standards Institution. Mr Pue Rochanapurananda, Chairman

Relief grinding fixture, manufactured by the Fuel Injection Equipment, Khalkaranji

Delegates of the Asian Productivity Council, who visited ISI, are discussing with the Director ISI at the standards exposition hall

APO headed the party. The visitors were received by Dr Lal C. Verman, Director ISI, who took them round the Institution and acquainted them with its activities. The visitors evinced keen interest in the training programmes imparted by ISI to its probationary officers and others nominated by overseas countries. Last year nominees of the Government of Malaysia, Thailand and other South-East Asian Countries participated in the programme.

Mr Pue Rochanapurananda and other members of the party, who were much impressed by ISI's significant role in the industrialization of the country, expressed appreciation of the expanding standardization activities of the Institution.

HENRY ST. LEGER RELINQUISHES OFFICE

Mr Henry St. Leger, General Secretary of the International Organization for Standardization (ISO) relinquished his office for health and personal reasons on 15 December 1965. Mr St. Leger was appointed General Secretary in June 1947. He held this post for 18 years during which period ISO developed into an important and effective international organization. In his parting message, Mr St. Leger requests his colleagues 'to always remember that they have in ISO the unique possibility of helping others help themselves'.

Following Mr St. Leger's resignation, the Assistant General Secretaries, Mr W. Rambal and Mr R. Marechal, have been provisionally appointed to take over joint responsibility for the General Secretariat.

J. C. HENTSCH ELECTED ISO TREASURER

Mr Jean-Claude Hentsch of Messrs Hentsch & Co, Switzerland has been unanimously elected Treasurer of the International Organization for Standardization. Mr Hentsch assumed office on 1 January 1966.

Mr Hentsch, who succeeds Mr Jacques de Saugy (1959-65), is a graduate engineer of the Federal Polytechnical School, Zurich and holds a Master of Arts degree from Harvard University (USA).

T. BEDFORD HEADS SABS

Mr T. Bedford, formerly Deputy Director, South African Bureau of Standards has been appointed Director of the Bureau. Mr Bedford joined the Bureau in 1946 as Principal Technical Officer of the Chemistry Section. He undertook an extensive overseas trip in 1949 and visited a number of standards bodies. Soon after he rose to the rank of Assistant Director, and in April 1963, was appointed Deputy Director of the Bureau.

A graduate from the Witwatersrand University, Mr Bedford served the Victoria Falls Power Company and the South African Railways in Cape Town, before joining the South African Bureau of Standards.

Mr T. Bedford, Director of SABS

K. L. MOUDGILL AWARD — DR N. N. DASTUR'S DONATION TO ISI

Dr N. N. Dastur, Director, National Dairy Research Institute, Karnal, who is the recipient of the K. L. Moudgill Award for 1965, has donated to ISI the cash award of Rs 1 000. ISI has gratefully accepted this generous gesture of Dr Dastur. The two donations of Rs 501 each have been earmarked for ISI Building Fund and Staff Welfare Fund.

NBO DISPLAY CENTRE

To provide at a central place a representative and up-to-date selection of materials, designs and techniques used for construction of buildings and houses which will be useful to architects, engineers and others interested in the subject, the National Buildings Organization (NBO) has established a display centre at Nirman Bhavan, New Delhi.

The centre, which will be run by the NBO as a nonprofit making organization, will be in the nature of a permanent building exhibition in which space will be let-out to exhibitors.

SIEMENS START A NEW JOURNAL

Siemens India Ltd have started the publication of a quarterly journal called Siemens Circuit. The journal aims at disseminating information on the extensive activities of Siemens. The first number released in October last includes articles on 'Selection of electrical equipment for machine tools', 'Electro-magnetic clutches in machine tools', 'Ward-Leonard control with voltage-regulated compounding for machine tools' and 'Jointing techniques for cables'.

'METRIC MEASURES' CEASES PUBLICATION

Publication of *Metric Measures*, an informative monthly journal of weights and measures, issued by the Directorate of Weights and Measures of the Union Ministry of Commerce, ceased publication from January 1966. The step has been taken with a view to conserving paper stocks and printing capacity in the present state of emergency in the country. The journal was started eight years ago when the metric system of weights and measures was adopted in the country, and has played a useful part in educating industry and trade and the people in general in the implementation of the new system.

INDIAN STANDARD WITHDRAWN

Two Indian Standards 'IS : 133-1950 Enamel, brushing, interior, (1) undercoating, and (2) finishing, colour as required' and 'IS : 134-1950 Enamel, spraying, interior, (1) undercoating, and (2) finishing, colour as required' have been revised and amalgamated as 'IS : 133-1965 Enamel, interior, (a) undercoating, and (b) finishing, colour as required'. IS : 134-1950 has, therefore, been withdrawn.

ANNOUNCEMENT

Dr Sadgopal, Head of Chemical Department, ISI, has been appointed Vice-President and Member of the Fellowship/Associateship (without examination) Subcommittee of the Institution of Chemists (India) for the year 1966. He has also been appointed a Member of the Finance and Building Subcommittee of the Executive Council of the Central Indian Medicinal Plants Organization, Lucknow.

OBITUARIES

■ **Shri V. V. Apte,** Managing Director of the Maharashtra Small Scale Industries Development Corporation Limited, passed away on 13 November 1965, in his fifty-seventh year, at Bombay.

Shri Apte was for sometime the Director of Industries in Maharashtra. He was also connected with the State Committee for Implementation of Metric System of Weights and Measures. He was associated with ISI as the Chairman of the Commercial Weights and Measures Sectional Committee, EDC 41.

■ **Dr Hiralal Roy,** Professor Emeritus, Jadavpur University, and a former Chairman of the Chemical Division Council of ISI, passed away on 26 July 1965. He was 76.

Dr Roy was an eminent educationist and a foremost chemical engineer in the country. A Founder President of the Indian Institute of Chemical Engineers, Dr Roy was the guiding spirit behind the spectacular growth of the chemical engineering education in India ever since the subject was introduced in 1921 in the curriculum of the then Bengal National College, the nucleus of the present Jadavpur University. Dr Roy was closely associated with numerous scientific and professional institutions in India and abroad.

Dr Hiralal Roy

THIRD DAIRY INDUSTRY CONFERENCE

■ The Third Dairy Industry Conference which was held in Bombay last January mainly devoted its attention to ways and means of increasing milk production and dairy throughput to meet the increasing needs of milk and milk products in the country. Organized by the Indian Dairy Science Association, the Conference was inaugurated by Shri P. K. Savant, Agriculture Minister, Maharashtra, who highlighted the progress made by the dairy industry in the premier dairy State of India and outlined the steps proposed to be taken for augmenting milk supplies and the incentives proposed to be given to producers. The problems faced by the industry due to the sudden spurt in the demand for milk and milk products not only from the general public but also from defence were reviewed by Dr V. Kurien, President, Indian Dairy Science Association. Shri S. J. Majumdar, Joint Secretary, Ministry of Food & Agriculture briefly explained programmes for the development of dairy industry during the Fourth Five-Year Plan. Emphasis was to be laid on increasing milk production in areas where major milk plants were located.

The Conference discussed the common problems faced by the industry, particularly the challange of increasing milk production in India.

Emphasizing that every dairy should undertake an integrated programme to increase milk production in its area of collection, the Conference felt that improved milk production could best be achieved as part of a scientific effort to improve the total agricultural infra-structure. It was recommended that the limited resources available for improvement in cattle should be concentrated in areas with the best potential for increased milk production.

The Conference noted the regulations imposed in the Punjab and West Bengal which have led to higher milk throughputs in dairies in these two States. It was strongly urged that the price paid under such controls should be a sufficient incentive to higher milk production. The Conference also strongly recommended the Central and State Governments to strictly enforce *The Prevention of Food Adulteration Act.*

Among the topics suggested for research and investigation were:

a) scientific approach for orienting dairy husbandry research to achieve maximum milk production;

b) evolving new equipment for economic use in milk production and collecting centres;

c) rapid, reliable, simple and inexpensive tests for evaluating the quality of milk and milk products; and

d) import substitution of materials used in processing of milk and milk products.

The Conference recognized the importance of compounded cattle feed in increasing milk production and viewed with concern the acute shortage of raw materials. The importance of augmenting feed and fodder production and measures for its conservation were stressed.

The Conference felt that with the growing pressure on land, the time had come when a deliberate and effective programme for economic disposal of useless and surplus cattle should be faced and undertaken.

An interesting exhibition displaying dairy equipment, quality control accessories, veterinary products and compounded cattle feeds was organized concurrently with the Conference.

REVIEWS

■ Higher Mathematics for Production Engineers

J. Sanger. Macmillan & Co London. 1964. P viii+304. Price Rs 24·00.

This book is designed primarily to meet the requirements of students preparing for examinations in production engineering.

It begins with an introduction to differentiation and partial differentiation and then deals with the fundamental aspects of analytical geometry. This is understandable because the geometrical approach to many design problems often facilitates their solution. Due consideration to curvature, the evolutes and involutes, and to various aspects of integration and its applications has been given in subsequent chapters.

Recent developments in manual and electronic computers have resulted in tremendous advances in mathematical techniques of numerical analysis. Hence a chapter has been devoted to the fundamentals of this topic which introduces the student to difference tables, interpolation formulæ, numerical differentiation and integration, and the solution of equations. The typology of solids which furnishes a highly effective approach to compound angle problems has also been briefly touched upon followed by the theory of complex numbers.

In the study of mechanical and other systems, students usually come across equations involving one or more differential coefficients. Hence, solutions of such equations, of both the first and the second order, have been included for their benefit. In order to graphically determine the value of one variable corresponding to the other, intercept charts and nomograms relating to three or more variables have been included.

The discussions of statistical techniques which have proved immensely useful in scientific control of quality in modern mass production, and of the fundamental statistical theory on which the quality control methods are based, are worth a mention here. Other subjects, such as control charts for the mean and the range, fraction defective, and the elements of continued fractions have also been dealt with separately.

The book includes two appendices giving the ordinates of the normal curve and the proportion of area lying between the mean ordinate and the ordinate at a specified distance.

An important feature of the book is that the presentation of the text is quite lucid, precise and straightforward. Worked examples have been copiously given to clarify the various points throughout the text. The book can be profitably used by the students and engineers alike for acquiring a basic understanding of what may be called 'production mathematics'.

B. N. SINGH

■ Fracture Toughness Testing and its Applications (STP 381)

American Society for Testing and Materials, Philadelphia, USA. 1965. P x+409. Price $ 19·50.

Development of new high-strength alloys and their application in aero space and in other critical fields has necessitated a more thorough study in the field of fracture mechanics to evaluate crack-propagation resistance of

such alloys. The technology of fracture toughness testing of material which includes a study of the problem of brittle fracture of these alloys in service has, therefore, rapidly progressed in recent years. In order to understand the basic concepts of fracture mechanics more clearly and to select the proper methods of fracture toughness testing with a sound understanding of their usefulness and limitations, the ASTM Special Committee on Fracture Testing of Metallic Materials at its Annual Meeting in 1964 held a three-session symposium on fracture toughness testing and its applications. This book is the outcome of the symposium.

The papers included in this book have been grouped into three main sections. In the first section a critical review of the basic principles of fracture mechanics and its limitations in practical applications has been made. In the second section, the papers deal with comprehensive surveys of current methods of fracture toughness testing, the general principles involved and their limitations. The third section deals with the review of application of fracture mechanics to typical engineering problems, such as, selection of material, prediction of life of structure, etc. It also throws light on how fracture toughness testing may be applied in the development of alloy steels. At the end of the book has been incorporated the Panel discussion which took place at the last session of the symposium.

It is hoped that this book would be of primary value, particularly to those who are concerned with study and investigation in the field of fracture mechanics of metallic materials.

H. P. GHOSE

■ Continuous Measurement of the Cure Rate of Rubber : STP 383

American Society for Testing and Materials, Philadelphia, USA. 1965. P vi+114. Price $ 5·50.

Determination of optimum cure and rate of cure are essential pre-requisites in the selection of rubber stocks for particular articles. The classical methods of determining curing characteristics are time consuming and, therefore, ineffective in translating the pilot plant studies to production level. Recent developments in instrumentation discussed in this book, however, now make it possible to get more precise information in simple, fast and non-intermittent tests. The new devices are Agfa vulcameter, Wallace-Shawbury curometer, Cepar apparatus, Oscillating disk rheometer, Viscurometer and Instron tester. Notable features of these instruments are the rapidity and the economy achieved in laboratory man-hours. These instruments will be a boon to in-plant standardization and mass production techniques where rapid evaluation of properties of newer elastomers introduced in the field of rubber manufacture is desired.

These new developments have been discussed in six papers which comprise this book. The papers were presented at the ASTM Symposium on Cure Rate of Rubber by Various Continuous Devices at Chicago in 1964. The papers discuss, in general, the part played by these instruments in solving various problems of practical significance to the production. The data obtained with the new devices have been compared with those obtained by conventional apparatus.

Since the devices discussed were described in earlier ASTM publications, the present publication gives a minimum of machine function description, and a maximum of information regarding utilization in investigating practical problems in rubber technology.

Determination of vulcanization and processing parameters and activation energies for vulcanization of a variety of rubber compounds have been described in the paper 'Continuous Measurement of Rubber Vulcanization with the Agfa Vulcameter'. With an improved paddle and platen system, the Wallace-Shawbury curometer, as described in another paper, permits the determination of plasticity of the unvulcanized rubber, in addition to the scorch and cure times. Using a bit complicated analysis of the curometer traces, more fundamental data on the kineties of the cross-linking reaction can be derived. This instrument is suited to routine operation and fundamental investigations.

Experience with Cepar apparatus shows that it can be used not only to detect variations in a given compound, but also to select compounds which show inherently low variations. This new single station instrument which features kymo-graph recording helps *in situ* sample preparation and simple data interpretation.

The Monsanto oscillating disk rheometer described in the paper 'The Uses of an oscillating disk rheometer for determining the rheological properties of elastomers during vulcanization', quickly and precisely determines the dynamic properties, curing and processing characteristics of elastomers during the entire curing cycle. A study of viscurometer variables as described in another paper, has provided some insight into the importance of typical compounding and instrument variables as they effect the use of viscurometer. The paper gives further indication to the direction of future work in this area. In the last paper entitled 'Vulcanization measurement using the Instron tester' measurements of vulcanization activity at temperatures of current commercial interests have been rugged by a proposed method.

The book opens fresh avenues for the study of continuous measurements of cure rate of rubber, and for the study of cross-linking variations. It will be primarily of interest to those who are intimately connected with the rubber technology, both in research and in industry.

N. R. SRINIVASAN

Publications Received

Application of Advanced and Nuclear Physics to Testing Materials (STP 373)

American Society for Testing and Materials, Philadelphia, USA. 1965. P vi+134. Price $ 6·25.

Educators Guide to Free Guidance Materials

Educators Progress Service, Randolph, Wisconsin, USA. 1965. P xxi+190.

Moisture in Materials in Relation to Fire Tests (STP 385)

American Society for Testing and Materials, Philadelphia, USA. 1965. P vi+123. Price $ 7·00.

Economy of Iron and Steel in Building Construction. (Report of the Committee Constituted by the National Buildings Organization)

National Buildings Organization, New Delhi. Second reprint. 1961. P 46. Price Rs 1·75.

Coir Board Annual Report 1965

Coir Board, Ernakulam. P 46+Lxv.

Basic Ideas of Scientific Sampling (No. 4 of Griffin's Statistical Monographs and Courses)

Alan Stuart; edited by M. G. Kendall. Charles Griffin & Company Limited, London. 1964. P 99. Price 18 s.

Introduction to the Thermal Processing of Foods (An anthology of food science — Vol I)

S. A. Goldblith, M. A. Joslyn, and J. T. R. Nickerson. The AVI Publishing Company, Inc Westport, Connecticut, USA. 1961. P xv+1128. Price $ 17·50.

COMMITTEE MONTH

This month, we report the proceedings of 33 committees which held their meetings during 21 November to 20 December 1965. Detailed notes regarding some of the committee meetings are given below. The Table of Meetings (see *P 154*) *lists important items of the business transacted by other committees.*

EXECUTIVE COMMITTEE

Plans for the next training course of standards engineers to be started by ISI in early 1966 were noted by the Executive Committee at its ninetythird meeting held in New Delhi on 26 November 1965 under the chairmanship of Shri Jehangir J. Ghandy. The information about the course has been supplied to the Colombo Plan countries and those under the Special Commonwealth African Assistance Plan as well as to other developing countries through Indian Missions, Standards Bodies, and Government Departments dealing with standardization. In 1964, engineers and scientists from Malaysia, Philippines and Thailand attended the training course organized by the Institution.

Reviewing the progress of work during August-October 1965, the Committee noted that services of Shri S. K. Sen, Deputy Director, ISI, were being made available to the British Standards Institution for six months to organize a cell for co-ordinating metricization of British Standards. Shri Sen, who would spend 6 months in UK, was incharge of a similar programme in ISI as Head of the Metric Cell.

The Committee noted the selection of Shri M. V. Patankar, Deputy Director (Mechanical Engineering), ISI, as a member of the APO Study Mission on Machine Tools. Comprising members from Republic of China (Taiwan), Hong Kong, India, Japan, Republic of Korea, Nepal, Pakistan, Philippines, and Thailand, the Mission was to visit India, Republic of China and Japan to study trends, techniques and factors conducive to the development and improvement of the machine tool industry. The Team was specifically concerned with design and production techniques including standardization and quality control with particular reference to lathes, grinders, milling machines and drilling machines.

The Committee accorded recognition to Italab Engineering Private Ltd, Bombay, for testing of engineering products under the ISI Certification Marks Scheme.

MADRAS OFFICE

Progress made in regard to certification marking, implementation of Indian Standards, enrolment of members, and other related activities in the Southern Region was reviewed by the Advisory Committee for the ISI Branch Office, Madras (MAC) at its twelfth meeting held on 6 December 1965 at Madras. The Chairman, Shri D. C. Kothari, noted with satisfaction that during 1965 as many as 172 additional members had joined ISI as against 92 in 1964. Much of the credit for this went to the active interest taken by the State Advisory Subcommittees and also to the good offices extended by some of the members of MAC itself. Shri Kothari referred to the plan of the Institution for a two-fold increase in its activities during the Fourth Five-Year Plan. In an attempt to find resources to provide funds for the increasing activity, the Institution had been compelled to enhance the rate of subscription for different classes of membership and also to introduce two higher classes of membership. Shri Kothari appealed to all the members to co-operate wholeheartedly with the Institution in promoting its activities.

Shri Kothari was happy to find that a plot of land in the Ambattur Industrial Estate had been earmarked for a building for ISI Branch Office at Madras. He expressed his thanks to Shri R. Venkataraman, Minister of Industries, for the keen personal interest taken by him in the matter.

The Committee noted that there had been only 15 percent increase in the number of licences issued in the Southern Region as against 100 percent increase in the all-India figure. To some extent it was understandable as a large number of licences had been issued to steel mills and jute mills, of which there were not many in the Southern Region. However, the Committee felt that there was considerable scope for further licensing in the Region.

The Chairman drew attention of the members to the second ISI Building which was under construction. A new Building Fund Committee under the chairmanship of Shri K. K. Birla had been set up for raising a sum of nearly Rs 4 million required for the completion of the construction. The proportionate share from the South could be taken as Rs 800 000 for the realization of which, Shri Kothari called for active support from all quarters. So far the total amount contributed by the South as interest-free deposits and outright donations, in cash and kind, was of the order of Rs 141 953.

STRUCTURAL AND METALS

The Standing Working Committee of the Structural and Metals Division Council (SWCSM) at its fifth meeting held in New Delhi on 27 November 1965 noted with interest the report published recently by the National Council of Applied Economic Research, according to which over 23 percent of steel could be saved if the standards published so far on the subject were fully implemented. Presiding over the meeting, Shri Jehangir J. Ghandy appealed to members for wider implementation of Indian Standards and the recommendations made in the report to achieve maximum benefit from the work done in the country. The Committee noted that it had not been possible for India to participate in the recently held meetings of some 15 ISO technical committees which dealt with the problems of standardization in the field of structurals and metals. Shri Ghandy reiterated the importance of participation in the technical work of ISO so that India's viewpoints received due consideration while ISO Recommendations were evolved. He wanted ISI to make efforts to arrange for necessary foreign exchange for this purpose. The Committee felt that India's participation at the following forthcoming meetings of the ISO technical committees was very important and requested ISI Directorate to sponsor suitable delegations for the same:

- ISO/TC 44/SC 3 Filler Materials and Electrodes
- ISO/TC 44 Welding
- ISO/TC 17/WG 8 Dimensions of Hot Rolled Steel Sections

SWCSM reviewed the compositions of the Sectional Committees for

(a) Ferro Alloys, SMDC 8; (b) Foundry, SMDC 17; and (c) Pig Iron, SMDC 24; and reconstituted them for a further period of three years.

As many as 39 new subjects were approved for inclusion in the programme of work of various sectional committees dealing with chemical analysis of metals and their alloys, physical testing, wrought steel products, non-ferrous metals, steel, non-destructive testing, metallography and heat treatment, refractories, etc.

TEXTILE DIVISION COUNCIL

Important policy matters with regard to formulation of standards for fabrics demanded by ordinary consumer and the application of tex system in various sectors of textile industry were considered by the Textile Division Council (TDC) at its sixteenth meeting held in Bangalore on 14 December 1965, under the chairmanship of Shri Harshavadan Mangaldas. Reconsidering its earlier decision to confine its activities to the formulation of standards for only such of the finished fabrics of cotton, wool or synthetic fibres as were in demand by organized consumers like Defence, Railways and municipalities, the Council decided that standards might also be formulated for items which had become established varieties during the past few years or which were being exported in bulk. For this purpose, the Council invited Export Promotion Councils for the different sectors of the textile industry to propose subjects on which Indian Standards could be prepared.

The Council noted that the Indian Cotton Mills' Federation was contemplating to approach the Union Government to withdraw the French count system of yarn numbering. The final decision on adoption of tex system in the cotton textile industry was, therefore, withheld pending the reaction of the Government of India.

The Council appointed Shri P. S. Vilekar as Chairman of the Cotton Healds and Reeds Sectional Committee (TDC 22) and also reconstituted the following 12 Committees for another period of three years:

TDC 1 Textile Standards
TDC 2 Cotton, Yarn and Cloth
TDC 4 Wool
TDC 5 Textile Chemistry
TDC 10 Man-Made Fibre and Fabric
TDC 12 Textile Sizing and Finishing Materials
TDC 21 Textile Mill Leather Articles
TDC 30 Cotton Spinning Machinery
TDC 33 Sampling Methods
TDC 36 Woollen Carpets and Woollen Rugs
TDC 37 Woollen Druggets
TDC 38 Dyestuffs

Dr V. M. Thakur, Dr P. C. Mehta and Col Bhupinder Singh were appointed as members of the Council's Standing Working Committee (SWCT). The Council also decided to co-opt Dr T. S. Subramaniam as a member in his personal capacity so that he could continue to be its Vice-chairman.

The Council proposed that ISO should take up the work of formulation of a recommendation on the method of test for determination of clean wool fibre content of raw wool. As many as 28 new subjects were also approved for formulation of standards covering shoe laces, jute bags and wrappings, determination of water soluble matter of textile materials, laundering and dry cleaning instructions, lace, heald frames, namdas, pile carpets and different items of cotton khadi, such as pugree cloth, dosuti, long cloth, mazri, napkins, table cloth, towels and bedsheets.

PIEZO-ELECTRIC AND FERRO-MAGNETIC MATERIALS

Inaugurating the first meeting of Piezo-Electric and Ferromagnetic Materials Sectional Committee (ETDC 41) in New Delhi on 10 December 1965, Dr Lal C. Verman, Director ISI, recalled that the Committee belonged to a set of seven new Sectional Committees constituted by the Standing Working Committee of the Electrotechnical Division Council sometime ago to develop national standards expeditiously in view of the rapid expansion in the field of electronics. In the preparation of standards, the main object should be to achieve overall economy, use of indigenous materials and stimulation of export. Dr Verman cautioned against tendency to overstandardize as this could hamper progress.

Presiding over the meeting, Shri T. V. Ramamurti, Scientist, National Physical Laboratory, New Delhi, referred to the recommendations of the Bhabha Committee of the Government of India according to which electronic equipment and components worth Rs 16 000 million would be required in the next ten years. In view of the vast scope for expansion, Shri Ramamurti felt that the Committee, which would evolve standards for piezo-electric and ferromagnetic materials, had come into being at a very opportune time. The work of the Committee would result in economy and assist indigenous development and production of these components.

The Committee formulated its programme of work and allotted priorities for various subjects. The draft Indian Standard on 'Terminology for ferromagnetic oxide materials', was finalized for publication.

The Committee also agreed to take up the following new subjects on its programme:

a) General requirements and tests for crystal units used in filters,

b) Aerial rod made of ferromagnetic materials, and

c) IF cores made of ferromagnetic materials.

POLISHES

The Polishes Sectional Committee (CDC 48) which would formulate standards for polishing materials and allied products for use on diverse surfaces chalked out its programme of work at its first meeting held in New Delhi on 26 November 1965 under the chairmanship of Shri L. R. Sud of the Defence Research Laboratory (Materials), Kanpur. At the suggestion of Air India, the Committee set up a Subcommittee for Aircraft and Automobile Polishes because in their maintenance work, the aircrafts and automobiles industries use a variety of polishes like metal and floor cleaners, aluminium polishes, furniture polishes, etc. Separate subcommittees were also set up for footwear polishes and metal polishes.

Noting the bibliography of standards on polishes and the detailed technical note on the subject circulated by the ISI Directorate, the Committee agreed to take up the subject of aircraft polishes for the formulation of Indian Standards and assigned the work to the relevant subcommittee.

The availability of new raw materials, such as silicones, synthetic waxes, polymer emulsions, detergents and soaps, has brought revolutionary changes in the manufacture of polishes and cleaners. Standardization, it is expected, would assist the industry in procuring suitable raw materials and turning out quality products. Previously, the work for shoe polishes was being looked after by the Leather Sectional Committee and for metal polishes by the Paints and Allied Products Sectional Committee. The new Sectional Committee would not only take over these subjects, but would also initiate work on the formulation of standards for various other types of polishes.

TABLE OF MEETINGS

AGRICULTURAL AND FOOD PRODUCTS

AFDC 12 DAIRY INDUSTRY — Bangalore, 15 December 1965

Chairman Dr K. C. Sen
Jodhpur Park
Calcutta

Drafts finalized for publication — Methods of sampling and analysis for (a) Butter, (b) Ghee, and (c) Cream.

Drafts approved for wide circulation — Specifications for (a) Mobile kit for milk testing, and (b) Layout plan for ghee refinery.

AFDC 15 ANIMAL FEEDS — Bangalore, 16 December 1965

Chairman Dr N. D. Kehar
22/12 Punjabi Bagh
Ring Road
New Delhi

Drafts finalized for publication — Specifications for (a) Solvent extracted groundnut oilcake (meal) as livestock feed, and (b) Solvent extracted linseed oilcake (meal) as livestock feed.

Drafts approved for wide circulation — Specifications for (a) Solvent extracted coconut oilcake (meal) as livestock feed, and (b) Solvent extracted cotton seed oilcake (meal) as livestock feed.

AFDC 22 PROPAGATION MATERIALS — New Delhi, 22-23 November 1965

Chairman Dr A. B. Joshi
Director
Indian Agricultural Research Institute
New Delhi

Drafts finalized for publication — Specifications for seeds of (a) Groundnut, (b) Castor, (c) Safflower, (d) Sesamum, and (e) Tobacco.

Drafts approved for wide circulation — Specifications for seeds of (a) Rape and mustard, (b) Wheat, (c) Maize, and (d) Rice.

AFDC 23 FRUITS AND VEGETABLES — Bangalore, 13 December 1965

Chairman Shri R. T. Mirchandani
Agricultural Marketing Adviser
to the Government of India
Directorate of Marketing & Inspection
Nagpur

Drafts finalized for publication — Specifications for (a) Mango nectar, (b) Mango chutney, (c) Pickles, and (d) Papain.

Drafts approved for wide circulation — Specifications for (a) Mango pulp, (b) Tomato juice, (c) Tomato ketchup, (d) Tomato puree, and (e) Tomato paste.

CHEMICAL DEPARTMENT

CDC 13 INKS AND ALLIED PRODUCTS — Madras, 25-26 November 1965

Chairman Shri B. S. Naik
Deputy Director
Directorate of Printing & Stationery
Bombay

Draft finalized for publication — Specification for coloured chalks, moulded.

Drafts approved for wide circulation — Glossary of terms relating to ink industry. Specifications for (a) Correcting fluids, (b) Stamp pads for rubber stamps, (c) Type-writer ribbons, and (d) Poster colours.

New subjects — Ball point pen ink, sugar cane wax, and oil pastils.

CAFDC 5 OILS AND OILSEEDS — Madras, 10 December 1965

Chairman Dr J. S. Badami
Swastic Oil Mills Ltd
Bombay

Drafts finalized for publication — Specifications for (a) Neatsfoot oil, (b) Fish oil for leather industry, (c) Sesame seeds, and (d) Cottonseed oil (*revision of* IS : 543). Methods of test for oilseeds.

Drafts approved for wide circulation — Specifications for (a) Solvent extracted groundnut oil, and (b) Solvent extracted cottonseed oil.

New subjects — Castor seeds, copra, cotton seeds, *Karanja* seeds, *Kusum* seeds, linseed, *Mahua* seeds, *Neem* seeds, niger seeds, and safflower seeds.

CIVIL ENGINEERING DEPARTMENT

BDC 29 THE PLANNING AND ORGANIZATION AT SITE — Bangalore, 11 December 1965

Chairman Maj-Gen Harkirat Singh
Adviser (Construction)
Planning Commission
New Delhi

Draft approved for wide circulation — Recommendations for stacking and storage of building materials at site.

Other activities — The Committee decided to initiate work on the preparation of a standard schedule of rates, to unify the existing schedules adopted by different departments in regard to nomenclature of items, output of labour, material constants, etc. A separate subcommittee was constituted to take up this work. The schedule of rates is one of the best tools of management and there are big variations in the schedules being practised from one part of the country to another and also from one department to another.

BDC 33 TIMBER STORES — Dehra Dun, 2-4 December 1965

Chairman Dr A. N. Nayer
Chief Inspectorate of General Stores
Kanpur

Drafts finalized for publication — General requirements for wooden tool handles (*revision of* IS : 620). Specification for wooden fence posts.

Drafts approved for wide circulation — Specifications for (a) Solid wood pent top cases, (b) Rectangular solid wood packing cases (*revision of* IS : 1503).

BDC 41 WATERPROOFING AND DAMP-PROOFING — New Delhi, 29-30 November 1965

Chairman Shri M. L. Raheja
Dy Chief Engineer
North Western Zone
MES, Chandigarh

Draft finalized for publication — Specification for bitumen primer for use in waterproofing and damp-proofing.

Draft approved for wide circulation — Code of practice for waterproofing of wall openings and canopies.

BDC 43 FOUNDATION ENGINEERING — Madras, 18 December 1965

Chairman Prof Dinesh Mohan
Director
Central Building Research Institute, Roorkee

Draft finalized for publication — Code of practice for structural safety of buildings : Foundations (*revision of* IS : 1904).

Draft approved for wide circulation — Code of practice for design and construction of machine foundations : Part II Foundations for impact type machines.

CONSUMER PRODUCTS DEPARTMENT

CPDC 3 OIL AND GAS BURNING APPLIANCES (PRESSURE TYPE) — Calcutta, 22 November 1965

Chairman Dr N. K. Gopalan
Chief Inspectorate of General Stores
Ministry of Defence (DGI)
Kanpur

Drafts finalized for publication — Specifications for (a) Oil pressure stoves (very large), commercial designation No.3; and (b) Blow lamps (*revision of* IS : 1899).

CPDC 5 UTENSILS — Bombay, 20-21 December 1965

Chairman (for the meeting) Capt H. R. Dutta
Chief Inspectorate of General Stores
Ministry of Defence (DGI)
Kanpur

Drafts finalized for publication — Specifications for (a) Stainless steel cooking utensils, (b) Stainless steel table utensils, and (c) Domestic pressure cookers (*revision of* IS : 2347).

Draft approved for wide circulation — Specification for thick bottom aluminium utensils for hotels, restaurants and similar establishments.

CPDC 11 SURGICAL INSTRUMENTS — Bangalore, 13 December 1965

Chairman Col R. D. Ayyar
Safdarjang Hospital
Central Govt Health Scheme
(Ministry of Health)
New Delhi

Drafts approved for wide circulation — General requirements for forceps. Specifications for (a) Dissecting forceps (serrated), (b) Dissecting forceps (toothed), (c) Artery forceps (halsteds mosquito), and (d) Artery forceps (Spencer Wells pattern).

CPDC 12 MEDICAL GLASS INSTRUMENTS AND APPLIANCES — Bangalore, 12 December 1965

Chairman Lt- Col N. Narasimhan
Ministry of Defence (DGAFMS)
New Delhi

Drafts finalized for publication — Dimensions of hypodermic syringes, interchangeable type. Specification for hypodermic syringes for insulin and tuberculin injections.

New subjects — Vanslyke apparatus; micro syringes; and tubes for (a) widal, (b) weilfelix, (c) kahn, (d) W.R., and (e) folin Wu.

CPDC 13 ANAESTHESIA, RESUSCITATION AND ALLIED EQUIPMENT — Bangalore, 11 December 1965

Chairman Col M. Shankhla
Directorate General of Technical Development
(Ministry of Industry & Supply)
New Delhi

Drafts finalized for publication — Specifications for (a) Stethoscopes; (b) Sphygmomanometers, mercurial; (c) Anaesthetic airways; and (d) Mouth props and airways (London hospital pattern).

CPDC 16 FOUNTAIN PENS AND BALL POINT PENS — Bombay, 18 December 1965

Chairman Shri M. A. Jhangiani
Controller of Printing & Stationery
Government of India
New Delhi

Drafts approved for wide circulation — Specifications for (a) Ball point pen refills, (b) Ball point pens, and (c) Fountain pens.

New subject — Desk type fountain pens.

ELECTROTECHNICAL DEPARTMENT

ETDC 17 SWITCHGEAR AND CONTROLGEAR — Bangalore, 25-26 November 1965

Chairman Shri A. P. Seethapathy
Power Research Institute, Bangalore

Drafts approved for wide circulation — Specifications for (a) Normal duty air break switches and composite units of air break switches and fuses for voltages not exceeding 1 000 V, and (b) Switches and switch-isolators for voltages above 1 000 V but not exceeding 11 000 V.

New subject — Circuit breakers of voltage above 11 000 V.

ETDC 19 HIGH VOLTAGE TECHNIQUES — Bombay, 22-23 November 1965

Chairman Prof C. S. Ghosh
Head of the Electrical Engineering Department
University of Roorkee
Roorkee

Draft finalized for publication — Application guide for insulation co-ordination-equipment located in exposed situations.

Other activities — Amendments concerning the terminology for impulse voltage and currents and the extension of ranges of dry and wet bulb temperatures in the curve for the determination of absolute humidity to 'IS : 2070-1962 Method of impulse voltage testing', and 'IS : 2071-1962 Methods of high voltage testing' were agreed.

ETDC 23 ELECTRIC LAMPS AND ACCESSORIES — Bombay, 2 December 1965

Chairman Shri Sachin Sen
Indian Lamp Factories Association
Calcutta

Draft finalized for publication — Specification for automobile lamps (*revision of* IS : 1606).

Draft approved for wide circulation — Specification for tungsten filament electric lamps for railway rolling stock (*revision of* IS : 897).

ETDC 24 ELECTRONIC EQUIPMENT — New Delhi, 26 November 1965

Chairman Shri S. Thiruvenkatachari
Additional Chief Engineer
All India Radio
New Delhi

Drafts finalized for publication — General requirements for electronic voltmeter (pointer indicator type). Minimum requirements of domestic radio receivers (*revision of* IS : 615). Specifications for (a) Dry battery operated community radio receivers utilizing transistors, and (b) Direct reading pH meters.

Drafts approved for wide circulation — Methods of measurements on audio frequency signal generators. Requirements for general purpose audio frequency signal generators.

ETDC 32 CONDUCTORS AND CABLES — Bombay, 13-14 December 1965

Chairman Shri V. Venugopalan
Central Water & Power Commission
New Delhi

Drafts approved for wide circulation — Specifications for (a) Rubber insulated flexible trailing cables for use in coal mines, (b) Flexible trailing cables for use in quarries and metalliferous mines, (c) Aluminium conductors in insulated cables (*revision of* IS : 1753), and (b) Thermoplastic insulated weatherproof cables : Part III Polythene insulated and sheathed.

New subject — Solidal power cables.

MECHANICAL ENGINEERING DEPARTMENT

EDC 27 SCREW THREADS AND FASTENERS — Bangalore, 17 December 1965

Chairman Shri R. Krishnamurti
Director Standards (Mechanical)
Research, Design & Standards Organization
(Ministry of Railway)
Lucknow

Drafts finalized for publication — Dimensions for screw threads (dia range M 42 to M 150). Specification for hexagonal bolts and nuts (M 42 to M 150).

Drafts approved for wide circulation — Specifications for (a) Wing screws, (b) Knurled thumb screws, (c) Solid drilled tubular rivets, (d) Semi-tubular rivets, and (e) Bifurcated rivets.

New subjects — Fasteners for footwear industry (shoe shanks, light hand tacks, blue cut tacks, steel toe caps, and shoe eyelets) and screw threads for conduit pipes.

Other activities — It was decided to merge draft Indian Standard Specification for small head slotted countersunk machine screws (M 1·6 to M 6) with IS: 1365-1962 Specification for slotted countersunk head machine screws (1·6 to 20 mm)

EDC 43 ENGINEERING METROLOGY — Bangalore, 15-16 December 1965

Chairman Dr K. N. Mathur
c/o National Physical Laboratory
New Delhi

Drafts finalized for publication — Specifications for (a) Vernier callipers, (b) Toolmakers' straightedges, (c) Toolmakers' flats and high precision surface plates, (d) Snap gauges, (e) Plain plug gauges, and (f) Plain ring gauges.

Drafts approved for wide circulation — Specifications for (a) V-blocks for larger sizes of workpieces (dia range 300 mm to 2 000 mm), (b) Strip feeler gauges, (c) Slip gauge accessories, (d) Roughness comparison specimens, (e) Engineers' parallels, (f) Precision rollers, (g) Inside and outside callipers, (h) Spring callipers, (j) Dividers, and (k) Spring dividers.

New subjects — Thread profile gauges, receiver gauges, and wire gauges.

STRUCTURAL AND METALS DEPARTMENT

SMDC 6 STRUCTURAL SHAPES — New Delhi, 1 December 1965

Chairman Shri O. S. Murthy
General Manager
Western Railway
Bombay

Drafts finalized for publication — Specification for crane rail section.

Drafts approved for wide circulation — Rolling and cutting tolerances for hot rolled steel products (*revision of* IS : 1852). Specifications for (a) Hot rolled steel channel sections for general engineering purposes, (b) Rolled steel sections, tee bars (*revision of* IS : 1173), (c) Aluminium equal angles, (d) Aluminium unequal angles, (e) Aluminium channel sections, and (f) Light rail sections.

SMBDC 7 STRUCTURAL ENGINEERING — Bangalore, 20 December 1965

Chairman Shri K. K. Rao
Director Standards (Civil)
Research, Design & Standards Organization
Alambagh (Lucknow)

Drafts approved for wide circulation — Code of practice for (a) Steel tubular scaffolding : Part I Definitions and material, Part II General regulations for scaffolding; and (b) Use of high tensile friction grip bolts. Specification for rectangular pressed steel tanks (*revision of* IS : 804).

TEXTILE DEPARTMENT

TDC 27 TEXTILE MATERIALS FOR AERONAUTICAL PURPOSES — Bangalore, 15 December 1965

Chairman Shri S. Ramamritham
Directorate General of Civil Aviation
New Delhi

Draft finalized for publication — Specification for web, cotton, olive green for man-dropping parachutes.

Draft approved for wide circulation — Specification for linen sewing thread for aeronautical purposes (*revision of* IS : 2196).

Other activities — The Committee took cognizance of the acute shortage of foreign exchange faced by the country and emphasized the need for substitution of imported aeronautical textile materials by indigenous goods. Towards this end, it was decided that the organizations which are concerned with the use of aeronautical textile materials be requested to send an up-to-date list giving the various textile items they use to the ISI Directorate for circulation amongst other members of the Committee with a view to finding out what items could be manufactured within the country.

TDC 30 COTTON SPINNING MACHINERY — Calcutta, 26 November 1965; Belgharia (West Bengal), 27 November 1965

Chairman (for the meeting) Shri N. Radhakrishnan
Representing Khatau Makanji Spinning and Weaving Co Ltd, Bombay

Drafts finalized for publication — Specifications for (a) Travellers for ring spinning frame, and (b) Bottom rollers for cotton ring spinning frame (*revision of* IS : 2510).

Draft approved for wide circulation — Specification for roller bearing spindles for warp ring frames.

Other activities — The Committee reconstituted the ISO Work on Cotton Spinning Machinery Subcommittee, TDC 30 : 3. The Committee also decided to investigate the possibility of taking up the following subjects for formulation of standards: (i) Jockey pulley, (ii) Bobbin holder, (iii) Top clearers, (iv) Under clearers, (v) Shafts for tin roller and pulleys in ring frame, (vi) Comb box, (vii) Draft change gears, (viii) Twist change gears, (ix) Flyer, (x) Flyer spindles, and (xi) Drafting roller and gauges for speed frames.

Shri Chandar Sain

Shri M. V. N. Rao

Shri T. C. Kausar

OUR NEW OFFICERS

■ **Shri Chandar Sain,** promoted as Assistant Secretary, is an M.A. in English (1938) and holds a Diploma in Local Self-Government Rules (1937) from the University of Punjab. One of the oldest members of ISI staff, Shri Chandar Sain was among the first few to join the Institution in 1947, the year it was founded. Shri Chandar Sain is actively associated with several staff welfare activities of ISI, such as the ISI Cooperative Store, and the ISI Cooperative House Building Society Ltd. He is also the Civil Defence Officer for ISI. A good sportsman, he plays volley ball and table tennis.

■ **Shri M. V. Narayana Rao,** Extra Assistant Director (Publication), brings with him eight years of editorial experience, as Assistant Editor (*Indian Horticulture*), Indian Council of Agricultural Research, New Delhi, where he worked from 1960 to 1965 and as Sub-editor (Kannada), Directorate of Advertising and Visual Publicity, New Delhi (1957-60). Shri Rao, who is an M.A. in English literature from the University of Nagpur (1955), has, in addition, several years of teaching experience.

■ **Shri Trilok Chand Kausar,** Extra Assistant Director (Public Relations), has served the All India Radio, New Delhi, for 19 years (1946-65) in various capacities, namely, as Programme Secretary, Transmission Executive, and Programme Executive-cum-Assistant Producer. He also handled public relations work. A graduate with Honours in Economics from the Punjab University (1944), Shri Kausar has a natural flare for Urdu poetry. A creative literary artist of high excellence, Shri Kausar has been actively associated with several literary societies in the capital.

IMPLEMENTATION OF INDIAN STANDARDS

■ ADOPTION

A list of Indian Standards adopted by various Government Purchasing and consuming departments during December 1965 is given below. On 31 December 1965, 3 267 Indian Standards were in force, out of which 2 469 had thus been adopted by the Government.

Directorate General of Supplies and Disposals

IS : 334-1965 Glossary of terms relating to bitumen and tar (*revised*)

IS : 823-1964 Code of procedure for manual metal arc welding of mild steel

IS : 901-1965 Couplings, double male and double female, instantaneous pattern for fire fighting purposes (*revised*)

IS : 903-1965 Fire hose delivery couplings, branch pipe, nozzles and nozzle spanner (*revised*)

IS : 904-1965 2-way and 3-way suction collecting heads for fire fighting purposes (*revised*)

IS : 906-1965 Branch with revolving head for fire fighting purposes (*revised*)

IS : 1021-1964 Caustic soda, pure (*revised*)

IS : 1056-1965 Commercial metric weights (*revised*)

IS : 1264-1965 Brass ingots for gravity die castings and brass gravity die castings (including naval brass) (*revised*)

IS : 1322-1965 Bitumen felts for water-proofing and damp-proofing (*revised*)

IS : 1858-1964 Door mats, creal, bit and fibre (*revised*)

IS : 1885 (Part V)-1965 Electrotechnical vocabulary : Part V Quartz crystals

IS : 2039-1964 Steel tubes for bicycle and allied purposes

IS : 2187-1962 Worsted socks

IS : 2418-1964 Tubular fluorescent lamps for general lighting service

IS : 2600-1964 Methods of chemical analysis of high purity zinc and zinc base alloys for die castings

IS : 2894-1965 Wooden handles for wood working chisels and gauges

IS : 2895-1965 Wooden handles for engineers' files

Is : 2897-1965 Wooden handles for shovels

IS : 2917-1964 Umbrella ribs

IS : 2918-1964 Umbrella tubes, sticks and handles

IS : 2919-1964 Umbrella fittings

IS : 2927-1964 Brazing alloys

IS : 2952 (Part I)-1964 Recommendation for methods of measurement of fluid flow by means of orifice plates and nozzles

IS : 2960-1964 Bookbinding leather

IS : 2994-1965 Electric stoves

IS : 3027-1964 Zinc cyanide for electroplating

IS : 3028-1965 Method of measurement of noise emitted by motor vehicles

IS : 3033-1965 Accuracy requirements for dispensing pumps used in petroleum trade

IS : 3058-1965 Code of practice for fire safety of industrial buildings: Viscose rayon yarn and/or staple fibre plants

IS : 3065-1965 Cutting oil, sulphurized, for ferrous metals

IS : 3066-1965 Hot asphalt mixing plants

IS : 3079-1965 Code of practice for fire safety of industrial buildings: Cotton textile mills

IS : 3085-1965 Method of test for permeability of cement mortar and concrete

IS : 3087-1965 Wood particle boards (medium density) for general purposes

IS : 3091-1965 Aluminium bronze ingots and castings for overhead fittings in electric traction

IS : 3097-1965 Veneered particle boards

IS : 3103-1965 Code of practice for industrial ventilation

IS : 3113-1965 Prismatic binoculars for common use

IS : 3117-1965 Bitumen emulsion for roads (anionic type)

IS : 3135-1965 Cathetometer

IS : 3159-1965 Camp stoves

IS : 3164-1965 Oil pressure lamps, hanging type

IS : 3168-1965 Brass strip and foil for deep drawing

IS : 3171-1965 Dimensions for injection nozzle holders, size 'S' for diesel engines

IS : 3174-1965 Banjo bolts for fuel injection equipment for diesel engines

IS : 3175-1965 Copper washers for fuel injection equipment for diesel engines

Defence Research and Development Organization

IS : 724-1964 Mild steel and brass cup, ruler and square hooks and screw eyes (*revised*)

IS : 2500 (Part I)-1963 Sampling inspection tables: Part I Inspection by attributes and by count of defects

IS : 2533-1963 Geometry boxes

IS : 2636-1964 Wing nuts

IS : 2638-1964 Flat split cotters

IS : 2642-1964 Sizes of machine-tool tables

IS : 2643-1964 Dimensions for pipe threads for fastening purposes

IS : 2666-1963 Slide rules (linear type)

IS : 2680-1964 Filler rods and wires for inert gas tungsten arc welding

IS : 2687-1964 Cap nuts and domed cap nuts

IS : 2695-1964 Drawing filing equipment

IS : 2698-1964 Leather roller skins

IS : 2699-1964 Flats and flats' screws

IS : 2710-1964 Parallel keys and keyways for machine tools

Research, Designs & Standards Organization

IS : 2004-1962 Carbon steel forgings for general engineering purposes

■ RECOMMENDATIONS FOR IMPLEMENTATION

Purchase of Stores as per Indian Standard Specifications

Indian Standard Specification for Glass Making Sands (IS : 488-1963) — *Director of Industries and Commerce, Trivandrum* has issued instructions to the Regional Joint Directors and Industrial Chemists in the State to adopt IS : 488-1963 (Glass Making Sands).

Structural Engineers' Handbook: Part I—*The Syndicate of Madras University* have approved Section A of this Handbook for use as 'Metric Steel Tables' in the Colleges.

NEW SUBJECTS

■ *The following subjects were recommended for formulation of Indian Standards during January 1966.*

STRUCTURAL AND METALS DEPARTMENT

Methods of chemical analysis of
a) brazing alloys
b) palladium
c) ferro zirconium, ferro boron and chrome manganese

Calibration of
a) pendulum impact testing machines
b) elastic proving devices
c) rockwell B & C scale hardness testing machines
d) standardized blocks to be used for rockwell B & C scale hardness testing machines
e) standardized blocks to be used for vickers hardness testing machines, and
f) standardized blocks to be used for brinel hardness testing machines

Shot peening test on springs

Flattening test on aluminium and aluminium alloy, tubes

Torsion test for aluminium and aluminium alloy, wire

Wrapping test for aluminium and aluminium alloy, wire

Glossary of terms relating to methods of mechanical testing

Steel plates for flanging and pressing for carriage and wagons

Skelp and strip for the manufacture of tube

Secondary aluminium ingots for aircraft industry

Copper nickel shot

Nickel copper alloy castings

Reclaimed refined lead

Methods of assaying fine grade palladium

Pattern plates for moulding boxes

Guide pins for moulding boxes and pattern plates

Untreated carbon steel forgings for general industrial use

Electroplating coatings of gold for decorative purposes

Specification for chromate coating on aluminium

Code of practice for ultrasonic inspection of weldments, and ultrasonic testing and inspection of boiler steel plates

Reference radiographs for aluminium and magnesium castings

Reference radiographs for steel castings

Recommended practice for heat treatment of steels covered in IS : 1570-1961 Schedules for wrought steels for general engineering purposes

Method of determining average grain size of metals

Code of practice for heat treatment of aluminium and aluminium alloys

Carbon steel billets for re-rolling into spring steel

Tyre bead wire

Code for packaging of steel for export purposes

Recommended colour classification of rough diamonds

Silica bricks for coke ovens

Chemically bonded chrome-magnesite refractories and chemically bonded magnesite-chrome refractories

Handbook for refractories

Shri S. G. Barve, Member, Planning Commission (Centre), *in the 'Standards Exposition Hall', discussing ISI certified products with Dr Lal C. Verman, Director ISI. With back to the camera is Dr A. N. Ghosh, Joint Director ISI.*

SHRI S. G. BARVE VISITS ISI

■ Shri S. G. Barve, Member (Industry), Planning Commission, visited ISI on 11 February 1966. During his discussions with the Director, Dr Lal C. Verman, and the Departmental Heads, Shri Barve evinced keen interest in the implementation of Indian Standards and offered his help in the adoption of standards in certain important fields in the interest of material economy and efficiency. He suggested that ISI might prepare a paper setting out operative action in regard to such standards along with the benefits that might accrue from such action.

An item of interest covered during the discussion was the extent of implementation by the various State Electricity Boards of the Indian Standard Specification for outdoor type distribution transformers (IS : 1180-1964). This standard had been drawn up with the intention of reducing the variety in this range of transformers in so far as fittings and tappings were concerned, so that the manufacturers could economically produce transformers with wide applicability. As a result of repeated approaches to the Electricity Undertakings and State Electricity Boards, they had more or less agreed to implement this standard.

Another point discussed related to the statutory regulations that were needed in this country to ensure the manufacture and marketing of only safe domestic electrical appliances. A detailed note on this important aspect had also been sent to Shri Asoka Mehta, Union Minister for Planning. The Director ISI requested Shri Barve to have necessary action initiated in this matter. It was also mentioned in this connection that the Public Accounts Committee in Parliament had recommended introduction of such statutory regulations.

Advantages of a country-wide standardization of brick sizes on the basis of modular co-ordination were mentioned as another example. It was explained that such standardization was intended to help in the design of buildings, since modular co-ordination introduced inter-changeability in parts of the buildings, such as doors and windows.

Other points discussed related to the need to manufacture paper in the sizes recommended in the Indian Standard (IS : 1064-1961) and certification of flame-proof equipment for mines. The Central Mining Research Station, Dhanbad, had approved only types leaving it to the individual department concerned with this subject to buy certified equipment. ISI's intention to cover it under the Certification Marks scheme was to ensure a more detailed check during production.

CERTIFICATION MARKS

During December 1965, the Institution specified standard mark and prescribed marking fee for five products. Standard marks for four products were rescinded. Besides, 21 new licences were granted and another 75 renewed. Particulars of all these as well as of additional varieties of products included in the existing licences and of licences lapsed or renewal deferred are given in the tables which follow.

STANDARD MARKS AND MARKING FEES

DESIGN OF THE STANDARD MARK	PRODUCT/CLASS OF PRODUCT AND THE NUMBER OF THE RELEVANT INDIAN STANDARD	UNIT	MARKING FEE PER UNIT	GAZETTE OF INDIA, PART II, SECTION 3 (ii), NOTIFICATION REFERENCE	
				S.O. No. and Date	*Gazette Issue Dated*
	Ballasts for fluorescent lamps — IS : 1534 (Part I)-1960	One ballast	5 Paise	62 & 63 20-12-1965	1-1-1966
	Galvanized steel wire and taps for armoured cables — IS : 434 (Parts I and II)-1964, IS : 692-1965 and IS : 1554 (Part I)-1961 (*Standard marks not yet specified*)	One metric tonne	Re 1·00 per unit for the first 1 000 units; 50 Paise per unit for the 1 001st unit and above	57 & 59 17-12-1965	1-1-1966
	Liquid amine salts of 2, 4D — IS : 1827-1961	One litre	10 Paise		
	Enamel, synthetic, exterior, Type 1 (a) undercoating, (b) finishing, colour as required — IS : 2932-1964	One litre	0·5 Paisa	297 & 280 31-12-1965	22-1-1966
	Enamel, synthetic, exterior, Type 2 (a) undercoating, (b) finishing, colour as required — IS : 2933-1964	One litre	0·5 Paisa		

STANDARD MARKS RESCINDED

DESIGN OF THE STANDARD MARK	PRODUCT/CLASS OF PRODUCT AND THE NUMBER OF THE RELEVANT INDIAN STANDARD	UNIT	MARKING FEE PER UNIT	GAZETTE OF INDIA, PART II, SECTION 3 (ii), NOTIFICATION REFERENCE	
				S.O. No. and Date	*Gazette Issue Dated*
	Enamel, brushing, exterior, Type I (synthetic) (1) undercoating, (2) finishing, colour as required — IS : 520-1954	—	—	278 31-12-1965	22-1-1966
	Enamel, spraying, exterior, Type I (synthetic) (1) undercoating, (2) finishing, colour as required — IS : 521-1954	—	—		
	Enamel, brushing, exterior, Type 2 (1) undercoating, (2) finishing, colour as required — IS : 522-1954	—	—		
	Enamel, spraying, exterior, Type 2 (1) undercoating, (2) finishing, colour as required — IS : 523-1954	—	—		

NEW LICENCES GRANTED

[Published in the Gazette of India, Part II, Section 3(ii), dated 5-2-1966 under Notification Number S.O. 410 dated 19-1-1966]

NO. OF LICENCE AND DATE OF ISSUE	PERIOD OF VALIDITY From	To	NAME AND ADDRESS OF THE LICENSEE	ARTICLE/PROCESS COVERED BY THE LICENCE AND NUMBER OF THE RELEVANT INDIAN STANDARD
CM/L-1168 3-12-1965	1-1-1966	31-12-1966	Prem Conductors Pvt Ltd, Station Road, Vatva (Gujarat State)	Hard-drawn stranded aluminium and steel-cored aluminium conductors for overhead power transmission purposes — IS : 398-1961
CM/L-1169 3-12-1965	1-1-1966	31-12-1966	Central Insecticides & Fertilizers, 110 Industrial Estate, Indore (M.P.)	DDT water dispersible powder concentrates — IS : 565-1961
CM/L-1170 6-12-1965	16-12-1965	15-12-1966	Asmopal Engineering Co, C-16-17 Shri Ram Industrial Estate, Katrak Road, Wadala, Bombay	Small ac and universal electric motors with Class 'A' insulation, three-phase up to $\frac{1}{2}$ hp only — IS : 996-1959 ('RAJI' and 'AEC' brands)
CM/L-1171 6-12-1965	16-12-1965	15-12-1966	Power Cables Pvt Ltd, Vithalwadi, Kalyan	Steel wire for the core of steel-cored aluminium conductors for overhead power transmission purposes — IS : 398-1961
CM/L-1172 6-12-1965	1-1-1966	31-12-1966	The Premier Lighting Industries Pvt Ltd, Dr A. Nair Road, Bombay	Ballasts for fluorescent lamps (for switch start circuits — IS : 1534 (Part I)-1960 ('DAYLIGHT SUPER' brand)
CM/L-1173 7-12-1965	16-12-1965	15-12-1966	The Bharat Carbon & Ribbon Mfg Co Ltd, 543 Basantalal Saha Road, P.O. New Alipore, Calcutta	Carbon paper for typewriters — IS : 1551-1959 (Type 1 without brand and Type 3 with brand name Mahal No. 2)
CM/L-1174 7-12-1965	16-12-1965	15-12-1966	Krishna Silicate & Glass Works Ltd, Baruipur, Post Office Baruipur, Distt 24 Parganas	Glass milk bottles — IS : 1392-1959
CM/L-1175 9-12-1965	1-1-1966	31-12-1966	Agromore Ltd, Mysore Road, Bangalore	Liquid amine salts of 2, 4-D — IS : 1827-1961 agromore weeder 96 (bladex G) and agromore weeder 96 special (bladex G special) brands
CM/L-1176 9-12-1965	1-1-1966	31-12-1966	Kesoram Spun Pipes & Foundries, (Prop : M/s Kesoram Industries & Cotton Mills Ltd), Bansberia, Distt Hooghly (West Bengal)	Centrifugally cast (spun) iron pressure pipes (size 80 mm to 400 mm), Class LA — IS : 1536-1960 ('KESOSPUN' brand)
CM/L-1177 13-12-1965	16-12-1965	15-12-1966	Power Cables Pvt Ltd, Vithalwadi, Kalyan	Armour wire for PVC insulated (heavy duty) electric cables — IS : 1554 (Part I)-1961
CM/L-1178 13-12-1965	1-1-1966	31-12-1966	Madhya Pradesh Industries, 31 Industrial Estate, P.O. Birla Nagar, Gwalior	Hard-drawn stranded aluminium conductors (AAC) for overhead power transmission purposes — IS : 398-1961 ('LION' brand)
CM/L-1179 15-12-1965	1-1-1966	31-12-1966	Apeejay Steel Casting Co Pvt Ltd, Netaji Subhas Road, Jullundur (Punjab)	Carbon steel bars, billets, blooms and slabs for forgings — IS : 1875-1961
CM/L-1180 15-12-1965	1-1-1966	31-12-1966	Dhawan Mills Co, 123/400 Mill Area, Fazalganj, Kanpur	BHC dusting powders — IS : 561-1962 ('GERMAR' brand)
CM/L-1181 15-12-1965	1-1-1966	31-12-1966	do	Chlordane dusting powders — IS : 2864-1964 ('GERMAR' brand)
CM/L 1182 15-12-1965	16-12-1965	15-12-1966	Fort Gloster Industries Ltd, Bauria, S. E. Railway	PVC insulated (heavy duty) electric cables for working voltages up to and including 1 100 volts — IS : 1554 (Part I)-1961 ('GLOSTER' brand)
CM/L-1183 16-12-1965	16-12-1965	15-12-1966	Pesticides India, Udaisagar Road, Udaipur	BHC emulsifiable concentrates — IS : 632-1958 ('VEGFRU' brand)
CM/L-1104 17-12-1965	1-2-1966	31-1-1967	Texmo Industries, Mettupalayam Road, R.S. Puram Post, Coimbatore	Three-phase induction motors up to 7·5 hp only — IS : 325-1961 ('TEXMO' brand)
CM/L-1185 17-12-1965	1-1-1966	31-12-1966	Grandlay Electricals (India), 456/426 Military Parade Road, Radio Colony, Delhi	Single core (unsheathed) PVC insulated cables with aluminium conductors, 250/440 volts and 650/1 100 volts grades — IS : 694 (Part II)-1964 ('GRANDLAY' brand)

NO. OF LICENCE AND DATE OF ISSUE	PERIOD OF VALIDITY From	To	NAME AND ADDRESS OF THE LICENSEE	ARTICLE/PROCESS COVERED BY THE LICENCE AND NUMBER OF THE RELEVANT INDIAN STANDARD
CM/L-1186 23-12-1965	1-1-1966	31-12-1966	Indo Engineering (Kota) Pvt Ltd, Industrial Estate, Kota (Rajasthan)	Hard-drawn stranded aluminium conductors for overhead power transmission purposes — IS : 398-1961 ('INDO' brand)
CM/L-1187 30-12-1965	16-1-1966	15-1-1967	Seshasayee Wire Ropes Ltd, Edathala P.O., Alwaye (Kerala State)	Steel wire ropes for haulage purpose in mines — IS : 1856-1961
CM/L-1188 30-12-1965	16-1-1966	15-1-1967	do	Steel wire ropes for general engineering purposes — IS : 2266-1963

LICENCES RENEWED

[Published in the Gazette of India, Part II, Section 3(ii), dated 5-2-1966 under Notification Number S.O. 411 dated 19-1-1966]

NO. OF LICENCE AND DATE OF ISSUE	PERIOD OF VALIDITY From	To	NAME AND ADDRESS OF THE LICENSEE	ARTICLE/PROCESS COVERED BY THE LICENCE AND NUMBER OF THE RELEVANT INDIAN STANDARD
CM/L-2 7-12-1955	1-1-1966	31-12-1968	The Indian Cable Co Ltd, 9 Hare Street, Calcutta	Hard-drawn stranded aluminium and steel-cored aluminium conductors of all types and sizes — IS : 398-1961
CM/L-3 7-12-1955	1-1-1966	31-12-1968	do	Cotton covered round copper conductors — IS : 450-1964
CM/L-4 7-12-1955	1-1-1966	31-12-1968	do	Hard-drawn copper conductors — IS : 282-1963
CM/L-6 7-12-1955	1-1-1966	31-12-1968	do	Rubber-insulated cables and flexible cords of all types and sizes — IS : 434 (Part I & II)-1964
CM/L-24 19-12-1956	1-1-1966	31-12-1966	Light Metal Works, New Sun Mill Compound, Delsile Road, Bombay	Wrought aluminium and aluminium alloy utensils — IS : 21-1959
CM/L-41 10-12-1957	16-12-1965	15-12-1968	M/s Carew & Co Ltd, Narsamuda, Asansol (West Bengal)	Rectified spirit, Grade 1 — IS : 323-1959
CM/L-85 24-4-1958	1-1-1966	31-12-1966	Hindusthan Timber Industries, 41 Chaulpatty Road, Beliaghata, Calcutta	Tea-chest plywood panels — IS : 10-1953
CM/L-111 16-12-1958	1-1-1966	31-12-1966	Beliaghata Timber Works Pvt Ltd, 28-B, Chaulpatty Road, Calcutta	do
CM/L-112 26-12-1958	1-1-1966	31-12-1966	The Kesar Sugar Works, 45-47, Apolo Street, Fort, Bombay	Hydroquinine, photographic grade — IS : 388-1963
CM/L-157 23-12-1959	1-1-1966	31-12-1966	Shamsher Sterling Cable Corpn Ltd, Vaswani Mansions, Dinsha Wacha Road, Bombay	VIR copper or aluminium cables for Fixed Wiring i) TRS (tough rubber sheathed) 250/440 volts ii) Braided and compounded 250/440 and 650/1 100 volts iii) Weatherproof 250/440 and 650/1 100 volts iv) Flame retarding 250/440 volts — IS : 434 (Parts I and II)-1964
CM/L-225 16-9-1960	1-1-1966	30-6-1966	Veneer Mills Pvt Ltd, Tinsukia, Assam	Tea-chest plywood panels — IS : 10-1953
CM/L-244 28-11-1960	16-12-1965	15-12-1966	Indian Plastics Ltd, Poiser Bridge, Kandivli, Bombay	Phenolic moulding materials, Grade 2 — IS : 1300-1963 ('FLORITE' brand)
CM/L-245 28-11-1960	16-12-1965	15-12-1966	Tipco, The Industrial Plastic Corpn Ltd, 14, Hamam Street, Fort, Bombay	Phenolic moulding materials, Grades 1, 2 and 3 — IS : 1300-1963
CM/L-248 19-12-1960	20-12-1965	30-11-1968	Kaira District Co-operative Milk Producers' Union Ltd, Anand (W.R.) Kaira District, Gujarat State	Infant milk foods — IS : 1547-1960
CM/L-250 26-12-1960	1-1-1966	31-12-1967	Krishnaveni Ink Factory, 292, Tiruvottiyur High Road, Madras	Ferro-gallo tannate fountain pen ink (0·1 percent iron content) — IS : 220-1959
CM/L-251 26-12-1960	1-1-1966	31-12-1967	do	Dye-based fountain pen inks, blue, green, violet, black and red — IS : 1221-1957
CM/L-252 26-12-1960	1-1-1966	31-12-1966	Tata Fison Industries Ltd, Union Bank Building, Dalal Street, Bombay	Copper oxychloride water dispersible powder concentrates — IS : 1507-1959

NO. OF LICENCE AND DATE OF ISSUE	PERIOD OF VALIDITY From	To	NAME AND ADDRESS OF THE LICENSEE	ARTICLE/PROCESS COVERED BY THE LICENCE AND NUMBER OF THE RELEVANT INDIAN STANDARD
CM/L-253 26-12-1960	1-1-1966	31-12-1968	Travancore Chemical & Manufacturing Co Ltd, Manjummel, Alwaye	Copper oxychloride water dispersible powder concentrates — IS : 1507-1959
CM/L-343 27-9-1961	16-10-1965	15-10-1966	S.G. Can Factory, Yamunanagar (Rly. Station Jagadhri)	18-litre square tins — IS : 916-1958
CM/L-347 29-9-1961	16-10-1965	15-10-1966	The Mysore Electro-Chemical Works Ltd, Rajajinagar, Yeswantpur, Bangalore	Lead-acid storage batteries (light duty) for motor vehicles — IS : 395-1962
CM/L-361 27-11-1961	16-12-1965	15-12-1966	Modi Vanaspati Mfg Co, Modinagar, Distt Meerut (U.P.)	18-litre square tins — IS : 916-1958
CM/L-363 30-11-1961	16-12-1965	15-12-1966	Nielcon Pvt Ltd, 37 F, Parel Road Cross Lane, Chinckpokli, Bombay	Three-phase induction motors up to 10 hp — IS : 325-1961
CM/L-365 12-12-1961	1-1-1966	31-12-1966	Ditz Electricals (India) Ltd, 29 Malkaganj Road, Delhi	Electric portable immersion heaters for domestic use (500 watts to 4 000 watts capacity) — IS : 368-1963
CM/L-366 15-12-1961	1-1-1966	31-12-1966	Tungabhadra Industries Ltd, Kurnool (Andhra Pradesh)	18-litre square tins — IS : 916-1958
CM/L-367 15-12-1961	1-1-1966	31-12-1966	Bharat Pulverising Mills Pvt Ltd, 589 Thiruvottiyur High Road, Madras	Endrin emulsifiable concentrates — IS : 1310-1958
CM/L-369 22-12-1961	1-1-1966	31-12-1966	The D.C.M. Container Works, Najafgarh Road, New Delhi	18-litre square tins — IS : 916-1958
CM/L-370 22-12-1961	1-1-1966	31-12-1966	Excel Industries Pvt Ltd, 184-87 Ghodbunder Road, Jogeshwari, Bombay	Zinc phosphide, technical — IS : 1251-1958
CM/L-371 22-12-1961	1-1-1966	31-12-1968	Berar Oil Industries, Vanasdapeth, Akola	18-litre square tins — IS : 916-1958
CM/L-470 30-10-1962	1-11-1965	31-10-1966	Hind Tin Industries, 107-A Raja Dinendra Street, Calcutta	do
CM/L-477 29-11-1962	16-12-1965	15-12-1966	Shalimar Tar Products (1935) Ltd, P-46, Hide Road Extension, Kidderpore, Calcutta	Bitumen (plastic) for waterproofing purposes — IS : 1580-1960
CM/L-478 29-11-1962	1-1-1966	31-12-1966	do	Hot applied sealing compounds for joints in concrete — IS : 1834-1961
CM/L-479 29-11-1962	1-1-1966	31-12-1966	do	Preformed fillers for expansion joint in concrete non-extruding and resilient type (bitumen impregnated fibre) — IS : 1838-1961
CM/L-482 3-12-1962	16-12-1965	15-12-1966	Kamani Metals & Alloys Ltd, Agra Road, Kurla, Bombay	Brass sheets, Grade Bs 63 only — IS : 410-1959
CM/L-483 5-12-1962	16-12-1965	15-12-1966	Lakhi Trading Co, Village Road, Bhandup, Bombay	Wrought aluminium utensils, Grade SIC — IS : 21-1959
CM/L-484 20-12-1962	1-1-1966	31-12-1966	Vijaya Foundry, T.S. No. 10/1075/3 Puliakulam Road, Pappanaickenpalyam, Coimbatore	Horizontal centrifugal pumps for clear, cold, fresh water, size 25 mm × 25 mm to 100 mm × 100 mm — IS : 1520-1960
CM/L-486 20-12-1962	1-1-1966	31-12-1966	Gautam Electric Motors Pvt Ltd, 42 Okhla Industrial Estate, New Delhi	Fractional horse power electric motors, single-phase 1 hp and three phase ½ to 1 hp — IS : 996-1959
CM/L-598 7-11-1963	1-12-1965	30-11-1966	Skytone Electricals (India), 43 Industrial Area, Faridabad	i) Single core (unsheathed) PVC insulated cables, 250/440 volts and 650/1 100 volts grades with copper or aluminium conductors; ii) Single core (PVC sheathed) PVC insulated cables, 250/440 volts grade with copper or aluminium conductors; iii) Single core (PVC sheathed) PVC insulated cables, 650/1 100 volts with copper conductors only; and iv) Twin-twisted (unsheathed) flexible cords, 250/440 volts grade with copper conductors only — IS : 694 (Parts I & II)-1964
CM/L-599 7-11-1963	16-12-1965	15-12-1966	Gadre Brothers, Raviwar Peth, Madhavnagar, S-Rly, Distt Sangli, Maharashtra State	Parallel keys i) 12 × 8 × 80 mm, ii) 18 × 11 × 100 mm,

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				iii) 6×6×22 mm, iv) 8×7×28 mm, v) 8×7×40 mm, vi) 8×7×80 mm, and vii) 12×8×45 mm ('ELEPHANT' Brand) — IS : 2048-1962
CM/L-600 20-11-1963	16-12-1965	15-12-1966	Hind Cycles Ltd, 250 Worli, Bombay	Bicycle chains — IS : 627-1961
CM/L-601 20-11-1963	1-1-1966	31-12-1966	Central Distributors Ltd, Poisar Bridge, Kandivli, Bombay	14 SWG bicycle spokes (plain) with nipples and washers — IS : 630-1961
CM/L-605 29-11-1963	1-1-1966	31-12-1966	Skytone Electricals (India), 43 Industrial Area, Faridabad	a) VIR copper or aluminium Cables for fixed wiring i) Braided and compounded 250/440 and 650/1 100 volts ii) Tough rubber sheathed iii) Weatherproof b) VIR flexible copper cords (250/440 volts) i) Twisted and circular artificial silk or glace cotton braided — IS : 434 (Parts I and II)-1964
CM/L-606 29-11-1963	1-1-1966	31-12-1966	Associated Pigments Ltd, 260 Barrackpore Trunk Road, P.O. Sukchar, 24 Parganas	Zinc oxide for paints — IS : 35-1950 ('APL' Brand)
CM/L-607 11-12-1963	1-1-1966	31-12-1966	The Production Centre For Electric Motors (Govt of India, Ministry of Industry and Supply), Tiruvalla, Kerala State	Fractional horse power electric motors, single-phase capacitor start and three-phase squirrel cage induction motors — IS : 996-1959
CM/L-608 11-12-1963	1-1-1966	31-12-1966	Hindustan Steel Ltd, Bhilai Steel Plant, Bhilai, Distt Durg (MP)	Structural steel (ordinary quality) — IS : 1977-1962
CM/L-609 11-12-1963	1-1-1966	31-12-1966	The Tata Iron & Steel Co Ltd, Jamshedpur	do
CM/L-803 26-10-1964	1-11-1965	31-10-1966	Pratap Steel Rolling Mills, Chheharta (Punjab)	Structural steel (standard quality) of the following sections only: 1) M.S. rounds up to 16 mm dia and over 28 mm dia 2) M.S. squares up to 14 mm sq and over 28 mm sq 3) M.S. angles, flats, etc, where the cross-sectional area of the sample does not exceed 200 sq mm — IS : 226-1962
CM/L-804 26-10-1964	1-11-1965	31-10-1966	do	Structural steel (ordinary quality) of the following sections only: 1) M.S. rounds up to 16 mm dia and over 28 mm dia 2) M.S. squares up to 14 mm sq and over 28 mm sq 3) M.S. angles, flats, etc, where the cross-sectional area of the sample does not exceed 200 sq mm — IS : 1977-1962
CM/L-807 26-10-1964	1-11-1965	31-10-1966	Batala Engineering Co Ltd, Batala (Punjab)	Structural steel (standard quality) of the following sections only: 1) M.S. rounds up to 16 mm dia and over 28 mm dia 2) M.S. squares up to 14 mm sq and over 28 mm sq 3) M.S. angles, flats, etc, where the cross-sectional area of the sample does not exceed 200 sq mm — IS : 226-1962
CM/L-808 26-10-1964	1-11-1965	31-10-1966	do	Structural steel (ordinary quality) of the following sections only:

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				1) M.S. rounds up to 16 mm dia and over 28 mm dia 2) M.S. squares up to 14 mm sq and over 28 mm sq 3) M.S. angles, flats, etc, where the cross-sectional area of the sample does not exceed 200 sq mm — IS : 1977-1962
CM/L-815 30-10-1964	16-11-1965	15-11-1966	Shanmuga Sago Factory, Shevapet, Salem	Sago (*saboodana*) — IS : 899-1956
CM/L-817 30-10-1964	16-12-1965	15-12-1966	Sultania Rice & Sago Factory, Cuddalore Main Road, Tulukanur, Attur	do
CM/L-834 9-11-1964	1-12-1965	30-11-1966	Special Steels Ltd, Dattapara Road, Borivli (East), Bombay	Steel wire for the core of steel-cored aluminium conductors for overhead power transmission purposes — IS : 398-1961
CM/L-837 23-11-1964	16-11-1965	15-11-1966	Lucky Acid & Chemical Works, 32/2 Murari Pukur Road, Calcutta	Nitric acid, technical, pure and AR grades — IS : 264-1950
CM/L-840 23-11-1964	1-12-1965	30-11-1966	Shamsher Sterling Cable Corpn Ltd, Kirol-Ghatkopar, Bombay	PVC Insulated Cables a) Copper or Aluminium i) Single core (unsheathed) 250/440 and 650/1 100 volts b) Aluminium only i) Single core (PVC sheathed) 650/1 100 volts — IS : 694 (Parts I and II)-1964
CM/L-841 25-11-1964	16-12-1965	15-12-1966	The Chemi-Mineral Mills, Chakravarti Ashok Road, Industrial Estate, Kandivli (East), Bombay	BHC water dispersible powder concentrates — IS : 562-1962
CM/L-889 28-11-1964	1-12-1965	30-11-1966	Megna Mills Co Ltd, P.O. Jagatdal, 24 Parganas	Jute hessian — IS : 2818-1964
CM/L-890 28-11-1964	1-12-1965	30-11-1966	do	Jute sackings — IS : 1943-1964, IS : 2566-1965, IS : 2874-1964 and IS : 2875-1964
CM/L-891 28-11-1964	1-12-1965	30-11-1966	Alliance Jute Mills Co Ltd, P.O. Jagatdal, 24 Parganas	Jute hessian — IS : 2818-1964
CM/L-892 28-11-1964	1-12-1965	30-11-1966	do	Jute sackings — IS : 1943-1964, IS : 2566-1965, IS : 2874-1964 and IS : 2875-1964
CM/L-909 28-11-1964	1-12-1965	30-11-1966	The India Jute Co Ltd, P.S. Serampore, Hooghly	Jute hessian — IS : 2818-1964
CM/L-910 28-11-1964	1-12-1965	30-11-1966	do	Jute sackings — IS : 1943-1964, IS : 2566-1965, IS : 2874-1964 and IS : 2875-1964
CM/L-947 28-11-1964	1-12-1965	30-11-1966	The Agarpara Co Ltd, P.O. Kamarhatty, 24 Parganas	Jute hessian — IS : 2818-1964
CM/L-948 28-11-1964	1-12-1965	30-11-1966	do	Jute sackings — IS : 1943-1964, IS : 2566-1965, IS : 2874-1964 and IS : 2875-1964
CM/L-949 28-11-1964	1-12-1965	30-11-1966	Shree Hanuman Jute Mills, 76 Jogendra Nath Mukherjee Road, Ghusuri, Howrah	Jute hessian — IS : 2818-1964
CM/L-950 28-11-1964	1-12-1965	30-11-1966	do	Jute sackings — IS : 1943-1964, IS : 2566-1965, IS : 2874-1964 and IS : 2875-1964
CM/L-951 28-11-1964	1-12-1965	30-11-1966	The Kelvin Jute Co Ltd, Broad Loom Section at Waverley Jute Mills, Shamnagar, 24 Parganas	Jute hessian — IS : 2818-1964
CM/L-965 28-11-1965	1-12-1965	30-11-1966	Shree Luckminarayan Jute Mfg Co Ltd, 107 G. S. Mukherjee Street, Konnagar, Hooghly	do
CM/L-966 28-11-1964	1-12-1965	30-11-1966	do	Jute sackings — IS : 1943-1964, IS : 2566-1965, IS : 2874-1964 and IS : 2875-1964
CM/L-975 30-11-1964	16-12-1965	15-12-1966	Hindustan Chains Pvt Ltd, G. T. Road, P.O. Pasonda, Ghaziabad (U.P.)	Wrought aluminium utensils, Grade SIC — IS : 21-1959
CM/L-976 30-11-1964	1-1-1966	31-12-1966	Bomin Pvt Ltd, Odhav, Ahmedabad	Three-phase induction motors (up to 10 hp only) — IS : 325-1961

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CM/L-977 30-11-1964	16-12-1965	15-12-1966	Industrial Research Corpn, 2/70 East Mada Street, Thiruvanmiyur, Madras	Ferro-gallo tannate fountain pen ink (0·1 percent iron content) — IS : 220-1959
CM/L-978 2-12-1964	7-12-1965	30-11-1966	Gladstone Lyall & Co Ltd, 59 Kali Charan Ghosh Road, Sinthi, Calcutta	Bitumen felts for waterproofing, Type 3, Grades 1 and 2 — IS : 1322-1965 ('GLASON' Brand)
CM/L-979 21-12-1964	1-1-1966	31-12-1966	Periyar Metal Products, Industrial Estate, Ettumanoor, Kottayam (Kerala State)	Wrought aluminium utensils, Grade SIC — IS : 21-1959
CM/L-980 31-12-1964	1-1-1966	31-12-1966	The Indian Cable Co Ltd, Golmuri, Tatanagar	PVC insulated (heavy duty) electric cables for working voltages up to and including 1 100 volts (with copper and aluminium conductors) — IS : 1554 (Part 1)-1961
CM/L-981 21-12-1964	1-1-1966	31-12-1966	Industrial Chemicals Ltd, Sankarnagar, Talaiyuthu R.S., Tirunelveli District	Calcium carbide, technical, quality A — IS : 1040-1960

ADDITIONAL VARIETIES OF PRODUCTS INCLUDED IN THE EXISTING LICENCES

SL NO.	LICENCE NO. (CM/L-)	NAME AND ADDRESS OF THE LICENSEE	RELEVANT IS NO.	REMARKS	GAZETTE OF INDIA, PART II, SECTION 3 (ii), NOTIFICATION REFERENCE S.O. and Date	Gazette Issue Dated
1	413	Devidayal Cable Industries Pvt Ltd, Gupta Mills Estate, Darukhana, Bombay	IS : 434 (Parts I and II)-1964	The list of articles included in the licence revised as under with effect from 16 Dec 1965: a) VIR Cables for Fixed Wiring i) Copper or Aluminium 1) TRS (tough rubber sheathed) 250/440 and 650/1 100 V 2) Braided and compounded 250/440 and 650/1 100 V 3) Weatherproof 250/440 V 4) Flame retarding 250/440 and 650/1 100 V ii) Aluminium only 1) Weatherproof 650/1 100 V b) VIR Flexible Copper Cables i) Welding cables c) VIR Flexible Copper Cords i) TRS (tough rubber sheathed) 250/440 V	134 28-12-1965	8-1-1966
2	589	P.V.C. Wires & Cables Pvt Ltd, 1 Ishan Ghosh Road, Calcutta	IS : 694 (Parts I and II)-1964	The list of articles included in the licence revised as under with effect from 27 Dec 1965: PVC Insulated Cable a) Copper or Aluminium i) Single core (unsheathed) 250/440 and 650/1 100 V b) Copper only 250/440 V i) Twin flat with or without earth continuity conductor (PVC sheathed)	131 24-12-1965	8-1-1966
3	698	Allied Industries, Hawa Sarak, Jaipur South, Jaipur	IS : 774-1964	The list of articles included in the licence revised as under with effect from 1 Dec 1965: '12·5 and 15 litres capacity cast iron flushing cisterns for water closets and urinals (bell type), high level'	133 27-12-1965	18-1-1966

SL NO.	LICENCE NO. (CM/L-)	NAME AND ADDRESS OF THE LICENSEE	RELEVANT IS NO.	REMARKS	GAZETTE OF INDIA, PART II, SECTION 3 (ii), NOTIFICATION REFERENCE	
					S.O. and Date	*Gazette Issue Dated*
4	998	M. L. Day & Co, 57-B Chittaranjan Avenue, Calcutta	IS : 2552-1963	Steel drums of 3 litres, 5 litres, 10 litres, 15 litres and 25 litres capacity, grade B2 (ungalvanized) and 25 litres capacity, grade B1 (ungalvanized) included in the licence with effect from 20 November 1965	3774 25-11-1965	4-12-1965
5	1116	Oriental Refrigeration and Engineering Co Pvt Ltd, 18 Najafgarh Road, New Delhi	IS : 1476-1959	The list of articles included in the licence revised as under with effect from 16 Dec 1965: 'Domestic refrigerators (mechanically operated) 5·3 ft³, 6·5 ft³ & 10 ft³ volume'	283 4-1-1966	22-1-1966
6	1138	Shiva Durga Iron Works (P) Ltd, 156/1 & 172/11, Madhusudhan Pal Chowdhury Lane, Howrah	IS : 780-1963	The list of articles included in the licence revised as under with effect from 16 Dec 1965: 'Sluice valves for water works purposes (inside screw non-rising spindle Type) Class 1, all sizes'	282 4-1-1966	22-1-1966
7	1149	Fort Gloster Industries Ltd, 14 Netaji Subhas Road, Calcutta	IS : 694 (Parts I and II)-1964	The list of articles included in the licence revised as under with effect from 27 Dec 1965: a) PVC Insulated Aluminium Cables (250/440 & 650/1 100 V) i) Single core (unsheathed) ii) Single core (PVC sheathed) iii) Circular twin, three and four cores (PVC sheathed) iv) Flat twin with or without earth continuity conductor (PVC sheathed) v) Flat three core (PVC sheathed) b) PVC Flexible Copper Cords i) Twin twisted (unsheathed) 250/440 V ii) Parallel twin (unsheathed) 250/440 V iii) Circular twin, three core and four core (PVC sheathed) 250/440 V	136 28-12-1965	8-1-1966
8	1155	Rajasthan Cable Industries Pvt Ltd, Industrial Area, Kota (Rajasthan)	IS : 434 (Parts I and II)-1964	The list of articles included in the licence revised as under with effect from 16 Dec 1965: a) VIR Cables for Fixed Wiring i) Copper or Aluminium 1) Braided and compounded 250/440 and 650/1 100 V 2) Tough-rubber sheathed 250/440 V 3) Weatherproof 250/440 V ii) Aluminium (650/1 100 V) 1) Weatherproof 2) Tough-rubber sheathed b) VIR Flexible Copper Cords (250/440 V) i) Braided and compounded ('Workshop' Type)	135 28-12-1965	8-1-1966

SL NO.	LICENCE NO. (CM/L-)	NAME AND ADDRESS OF THE LICENSEE	RELEVANT IS NO.	REMARKS	GAZETTE OF INDIA, PART II, SECTION 3 (ii), NOTIFICATION REFERENCE	
					S.O. No. and Date	*Gazette Issue Dated*
			ii) Twisted and circular artificial silk or glace cotton braided iii) Tough-rubber sheathed			

LICENCES CANCELLED/LAPSED OR RENEWAL DEFERRED

SL NO.	LICENCE NO. (CM/L-)	LICENSEE	PRODUCT AND RELEVANT IS NO.	REMARKS	GAZETTE OF INDIA, PART II, SECTION 3 (ii), NOTIFICATION REFERENCE	
					S.O No and Date	*Gazette Issue Dated*
1	5	The Indian Cable Co Ltd, 9 Hare Street, Calcutta	Bare annealed high conductivity copper wire for electrical machinery and apparatus — IS : 396-1953	Lapsed after 31-12-1965		
2	254	Swastik Rubber Products Ltd, 'SWASTIK HOUSE', Kirkee, Poona	Rubber-insulated cables, TRS (tough rubber-sheathed) 250 volts taped/untaped, braided and compounded 250 volts with copper or aluminium conductors, weatherproof cables 250 and 660 volts with copper conductors only; taped/untaped, braided and compounded 660 volts with copper or aluminium conductors — IS : 434 (Parts I and II)-1964	Lapsed after 31-12-1965	447 28-1-1966	12-2-1966
3	356	Zeta Industrial Corpn Pvt Ltd, 14F Govindpuri, Modinagar, Distt Meerut (U.P.)	Metal clad switches, 15 and 30 amperes of 250 and 500 volts grade and 60 amperes of 500 volts grade — IS : 1567-1960	Lapsed after 15-12-1965		
4	466	Sial Soap Stone Factory, (S.E. Rly), P.O. Barware, Via Katni, Distt Jabalpur (M.P.)	BHC dusting powders — IS : 561-1962	Renewal deferred after 15-12-1965		
5	480	Jai Electrical Industries, S/52 Industrial Area, Jullundur City (Punjab)	Metal clad switches, 15 and 30 amperes of 250 and 500 volts grade, 30 and 100 amperes of 500 volts grade — IS : 1567-1960	Lapsed after 15-12-1965		
6	513	Jai Hind Trading Corpn, Ghantewala Bagh, G. T. Road, P.O. Pasonda (Ghaziabad) (U.P.)	Tumbler switches, single pole, one way, with porcelain base and all bakelite, 5 amperes, 250 volts — IS : 1087-1957 and tumbler switches, single pole, 15 amperes, 250 volts — IS : 2120-1963	Cancelled with effect from 10-12-1965	3885 10-12-1965	18-12-1965
7	604	Kashmir Sports Industries, 143 Bhagat Singh Market, New Delhi	Footballs and volley-balls — IS : 417-1953	Lapsed after 31-12-1965		
8	748	Eagle Paint & Pigment Industries Pvt Ltd, 51 Chanditalla Main Road, Tollygunge, 24 Parganas	Ready mixed paint, brushing, finishing, semi-gloss for general purposes — IS : 123-1962	Lapsed after 31-8-1965	447 28-1-1966	12-2-1966
9	829	National Industrial Corpn, Warden House (First Floor), Sir Firozshah Mehta Road, Fort, Bombay	Structural steel (standard quality) — IS : 226-1962	Lapsed after 15-11-1965		
10	830	do	Structural steel (ordinary quality) — IS : 1977-1962	Lapsed after 15-11-1965		

INDIAN STANDARDS

The standards listed in this feature have been classified subject-wise and not according to the Departments in ISI responsible for formulating them.

■ NEW INDIAN STANDARDS

AGRICULTURAL AND FOOD PRODUCTS

IS : 3198-1965 Fodder yeast. Rs 5·00. Prescribes requirements and methods of test for fodder yeast used for supplementing animal feeds with protein and vitamin B complex group. The material conforming to the standard will be of uniform creamy white to yellowish brown colour having characteristic and odour of good quality yeast and free from lumps, visible mould growth, insect infestation, unpleasant or musty smell, added colour or other extraneous and deliterious substances. In addition to a minimum crude protein (N × 6·25) content of 45 p.rcent by weight, the material per 100 g, shall have a minimum content of 2·0 mg of thiamine, 3·0 mg of riboflavin, 30·0 mg of nicotinic acid and 10·0 mg of pantothenic acid.

CHEMICALS

IS : 3030-1965 Recommendations for letter symbols, signs and abbreviations used in chemical engineering. Rs 6·00. Deals with the letter symbols and abbreviations used in chemical engineering and also with the modifying signs that are used with these symbols. A selection of letter symbols used in domains other than chemical engineering is also included.

IS : 3069-1965 Glossary of terms, symbols and units relating to thermal insulation materials. Rs 3·50. In this standard, technical terms and units of measurements regarding thermal insulating materials, in the temperature range −200°C+1 000°C, have been precisely defined in the manner they shall be applicable to the relevant Indian Standards. The units specified here have been selected on the basis of experimental aspects so that the units are commensurate with the magnitude of test results normally obtained.

IS : 3200-1965 Methods of chemical analysis of cryolite. Rs 3·50. Prescribes methods for estimating fluorine, silica, iron oxide, calcium fluoride and total water in all forms of cryolite, such as natural, synthetic and recovered.

CIVIL ENGINEERING

IS : 208-1965 Door handles (revised). Rs 2·00. First published in 1950, this revision lays down requirements for materials, manufacture, dimensions and finish of cast, pressed oval, pressed half oval and fabricated door handles. The revised version provides for some additional size of door handles in some types, permits use of aluminium and zinc alloys as additional construction materials and specifies all dimensions in metric system.

IS : 2720 (Part XXII)-1965 Methods of test for soils: Part XXII Determination of organic matter. Rs 1·50

IS : 3129-1965 Particle board for insulation purposes. Rs 2·00

IS : 3201-1965 Criteria for the design and construction of precast concrete trusses. Rs 3·00. Applies to simply supported precast reinforced and prestressed concrete triangulated trusses with spans up to about 35 m. Certain essential features of construction which have a bearing on the design of precast concrete trusses have also been covered.

IS : 3348-1965 Fibre insulation boards. Rs 4·00. Classifies the various types of insulation boards made of wood or sugarcane fibre and lays down their essential requirements for general purposes. Also covers (a) bitumen-bonded fibre insulating board, and (b) flame-retardant treated fibre insulating board.

IS : 3362-1965 Code of practice for natural ventilation of residential buildings. Rs 2·00

ELECTRICAL ENGINEERING

IS : 3202-1965 Code of practice for climate proofing of electrical equipment. Rs 6·50. Covers the selection and treatment of materials used in electrical power equipment and the sealing of the equipment to ensure that it remains serviceable under conditions which may encourage chemical, physical and mechanical deterioration. This does not apply to (a) telecommunication and allied electronic equipment except where this forms an integral part of the power equipment, (b) equipment used in aircraft where special precautions may be necessary, and (c) packaging.

IS : 3324-1965 Holders for starters for tubular fluorescent lamps. Rs 4·50. Lays down the dimensional, safety and performance requirements of holders for two-pin type starters covered by IS : 2215-1963 Starters for fluorescent lamps *(revised)*.

IS : 3347 (Part I/Sec I)-1965 Dimensions for porcelain transformer bushings : Part I up to 1·1 kV bushings; section I Porcelain parts. Re 1·00

IS : 3347 (Part II/Sec I)-1965 Dimensions for porcelain transformer bushings: Part II 3·6 kV bushings; section I Porcelain parts. Re 1·00

IS : 3347 (Part III/Sec I)-1965 Dimensions for porcelain transformer bushings: Part III 12 and 17·5 kV bushings; section I Porcelain parts. Rs 1·50

IS : 3347 (Part IV/Sec I)-1965 Dimensions for porcelain transformer bushings: Part IV 24 kV bushings; section I Porcelain parts. Re 1·00

IS : 3347 (Part V/Sec I)-1965 Dimensions for porcelain transformer bushings: Part V 36 kV bushings; section I Porcelain parts. Re 1·00

EQUIPMENT, TOOLS AND APPLIANCES

IS : 905-1965 Delivery breechings, dividing and collecting, instantaneous pattern, for fire fighting purposes (revised). Rs 2·00

IS : 907-1965 Suction strainers, cylindrical and shoe types for fire fighting purposes (revised). Rs 2·00

IS : 3148-1965 Metallic slide fasteners. Rs 4·80. (British Standard '3084 : 1963' recognized as an Indian Standard with a few modifications).

IS : 3206-1965 Engineers' drawing instruments, dividers. Rs 1·50. Covers requirements of dividers provided with detachable needles and with or without fine adjustment device for engineers' drawing instruments.

IS : 3208-1965 Engineers' drawing instruments, half set of compasses. Rs 1·50. Covers requirements for half set of compasses provided with interchangeable lengthening bar, pencil point, pen point or needle point for engineers' drawing instruments.

IS : 3209-1965 Engineers' drawing instruments, spring bow compasses. Rs 1·50. Prescribes requirements for spring bow compasses for engineers' drawing instruments of the following types: (a) Spring bow pen, (b) Spring bow pencil, (c) Spring bow divider, and (d) Spring bow reversible pen-pencil.

IS : 3215-1965 Engineers' drawing instruments, needle points. Re 1·00

IS : 3216-1965 Engineers' drawing instruments, needles. Re 1·00. Covers requirements of needles of various types suitable for use with compasses, dividers, spring bow compasses, rotating compasses, needle points and prickers for engineers' drawing instruments.

IS : 3217-1965 Engineers' drawing instruments, prickers. Re 1·00

IS : 3365-1965 Floor polishing machines. Rs 1·50

IS : 3366-1965 Pan vibrators. Rs 2·00. Lays down requirements for materials, sizes, construction and performance of concrete vibrators of pan type excluding vibrators operated by pneumatic power or electromagnetic action. The specification is expected to provide guidance to manufacturers and users in obtaining suitable pan vibrators for use in construction of concrete floors and rafts, small repairs of concrete roads, haunching work and patching, construction of irregularly shaped bays, construction of special expansion joints in runway construction and compaction of moulds of prestressed concrete.

FARM IMPLEMENTS

IS : 3350-1965 Three-tined cultivator with seeding attachment, animal drawn. Rs 2·00

IS : 3360-1965 Soil scoop. Rs 1·50

IS : 3363-1965 Harrow patela. Rs 2·00

MECHANICAL ENGINEERING

IS : 3264-1965 Dimensions for diamond grinding wheels. Rs 3·00. Specifies the dimensions and the tolerances for diamond grinding wheels of the following types in metallic and resinoid bonds: (a) Straight cup wheels, (b) Double cup wheels, (c) Taper cup wheels, (d) Dish wheels, (e) Peripheral wheels, (f) Cut-off wheels, and (g) Chip breaker wheels.

STRUCTURAL AND METALS

IS : 23-1965 Primary (virgin) aluminium notched bars and ingots for remelting for aircraft purposes (second revision). Re 1·00

IS : 3332-1965 Nickel silver strip and foil for telecommunication purposes. Rs 2·50. Covers two grades of wrought nickel silver, namely, CuNi18Zn27 and CuNi12Zn25, in the form of cold rolled strip of width up to 30 cm and thickness from 0·16 mm up to and including 3·15 mm, and cold rolled foil of width up to 30 cm and thickness from 0·66 mm up to and including 0·16 mm.

SYNTHETIC FIBRES

IS : 3322-1965 PVC-coated fabrics for foul weather clothing. Rs 4·50. Deals with fabrics made out of cotton and rayon staple fibres coated on both sides with PVC and used in navy and merchant shipping for foul weather clothings. It also indicates base fabric types and weight-strength ratio that have been found serviceable for various foul weather garment purposes.

TEXTILES

IS : 2899-1965 Method for determination of percentage of medullated fibres in wool. Rs 1·50

IS : 3265-1965 Weft pirns (taper fit) for use in shuttles for plain calico looms. Rs 4·50. Covers requirements of weft pirns (taper fit) which are in common use in the textile industry for direct spinning of cotton and staple fibre yarns for use in shuttles for plain calico looms.

IS : 3356-1965 Jhoot silk coating. Rs 1·50. Prescribes constructional details and other particulars of three varieties of *Jhoot* silk coating woven on handloom.

IS : 3358-1965 Dupion silk fabric. Rs 1·50. Lays down constructional details and other particulars of two varieties of dupion silk fabric, dyed, woven on handloom.

IS : 3359-1965 Silk coating. Rs 1·50. Prescribes constructional details and other particulars of two varieties of silk coating woven on handloom.

IS : 3368-1965 Wooden heald frames for wire and flat steel healds. Rs 2·50

MISCELLANEOUS

IS : 3338-1965 Sizes of correspondence envelopes. Re 1·00

IS : 3339-1965 Silica flour for use in foundries. Re 1·00

■ DRAFT INDIAN STANDARDS

CHEMICAL ENGINEERING

Classification of hard coals by type

Compressed argon

Glossary of terms used in coal preparation plant

Methods of sampling and test for industrial effluents, Part II

Nitric acid

CIVIL ENGINEERING

Basket strainers for fire fighting purposes (cylindrical type)

Code of practice for lining of canals with burnt clay tiles

Code of practice for use of structural timber in building (material, grading and design) *(revision of* IS : 883)

Grading rules for teak squares

Hose binding machines

Laterite stone blocks for masonry

680-l/min trailer pump for fire brigade use *(revision of* IS : 943)

Recommendation for liquid flow measurement in open channels by dilution methods for measurement of

steady flow : Part I Constant rate injection method

Recommendation for liquid flow measurement in open channels by dilution methods for measurement of steady flow : Part II

Sandstone slabs for use in flooring

CONSUMER PRODUCTS

Metal chairs

Metal tables

Metal wardrobes (adjustable type)

ELECTRICAL ENGINEERING

Air dielectric variable capacitors

Audio frequency signal generators (30 c/s to 30 kc/s)

Capacitors for interference suppression devices

Dimensions of three-phase foot-mounted induction motors (*second revision of* IS : 1231)

Environmental tests for electronic equipment : Part ... Constant acceleration test

Environmental tests for electronic equipment: Part ... Gas tightness test

General letter symbols

Rectangular and square enamelled copper conductors

Requirements for general purpose audio frequency signal generators (30 c/s to 30 kc/s)

Roof extractor units

Rotary wafer switches (low current rating): Part II Rotary wafer switches type 1

Rotary wafer switches (low current rating): Part III Rotary wafer switches type 2

Valve sockets : Part III Valve sockets for octal base

Valve sockets : Part IV Valve sockets for 9-pin miniature base

EQUIPMENT, TOOLS AND APPLIANCES

1800-l/min motor fire engine (*revision of* IS : 945)

275-l/min portable pump set for fire fighting (*revision of* IS : 942)

1800-l/min trailer pump for fire brigade use (*revision of* IS : 944)

GLASS AND CERAMICS

Wired and figured glass

MECHANICAL ENGINEERING

Automatic weighing machines

Forged and type rigid couplings

Method for rating of machine cut spur and helical gears

Shaft ends

Straight sided serratins

Totalising weighing machines

RUBBER GOODS

Hospital sheetings

Post-mortem rubber gloves

Rubber ice bags

Surgical rubber gloves

STRUCTURAL AND METALS

Aluminised steel core wire for aluminium conductors (ACSR)

Antifriction bearing alloys (*second revision of* IS : 25)

Coal dust for use in cast iron foundry (*revision of* IS : 1752)

Code of practice for liquid penetrant flaw detection

Code of practice for magnetic particle flaw detection

Code of practice for ultrasonic testing by pulse echo method (direct contact)

Diameters of wrought aluminium alloys rivet, bolt and screw stock

Flame and induction hardening steels

Method for determination of proof stress and proving test for steel at elevated temperatures

Method for end quench test for hardenability of steel

Method for selection and preparation of samples and test pieces for mechanical tests for wrought steel

Methods of chemical analysis of foundry nickel

Methods of chemical analysis of metallic manganese

Printing metal (*revision of* IS : 1357)

Radiographic image quality indicators

Safety code for industrial radiographic practice

Steel plates for flanging and pressing

Tool and die steels for cold work

Wrought aluminium and aluminium alloys, bars, rods and sections (for general engineering purposes) (*revision of* IS : 733)

Wrought aluminium and aluminium alloys, forging stock and forgings (for general engineering purposes) (*revision of* IS : 735)

TEXTILES

B-twill cloth

Heavy cee cloth

Jute corn sack cloth

Method for determination of micronaire value of cotton fibres

Method for determination of strength of cotton fibres : Flat bundle method

Methods for sampling cotton fabrics for determination of physical characteristics

Methods for sampling cotton yarn for determination of physical characteristics

Roller bearing spindles for warp ring frames

Wooden staves for cotton healds

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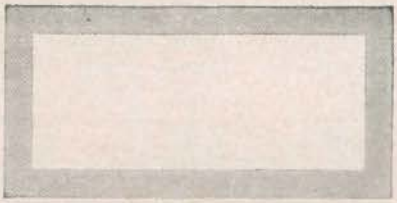

NEW ISI MEMBERS

During December 1965, 3 organizations enrolled as Subscribing Members for the year 1965; in addition 78 organizations and individuals enrolled as members for 1966. The net subscribing membership of ISI as on 31 December 1965 was 3 656, with 2 179 Sustaining Members, 953 Sustaining Members (Associates) and 524 Ordinary Members.

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AS C360 : 1965 Electrically heated ovens in which flammable volatiles occur, type 1 ovens

AS E35 : 1965 Seat belt assemblies for motor vehicles

AS K156 : 1965 Expanded polystyrene for thermal insulation

AS N58 : 1965 Corrugated fibreboard containers for frozen boneless meat for export

AS R28 : 1965 Sampling and chemical analysis of refractories and refractory materials

AS Z26 : 1965 Underwater breathing apparatus

CANADA

CSA C22.2 No. 10 : 1965 Electric floor surfacing and cleaning machines

UNITED KINGDOM

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B.S. 1133 : Section 4 : 1965 Mechanical aids in package handling

B.S. 1250 : Part 6 : 1965 Domestic appliances burning town gas : Part 6 Laundering appliances

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B.S. 1310 : 1965 Coal tar pitches for building purposes

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B.S. 3142 : Part 1 : 1965 Manufactured solid smokeless fuels for household use : Part 1 Cokes for domestic open fires

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B.S. 3861 : Part 1 : 1965 Electrical safety of office machines : Part 1 General requirements and tests for earthed equipment

B.S. 3876 : Part 3 : 1965 Rope rollers and mountings for colliery track haulage : Part 3 Rollers with non-metallic rope bearing surfaces

B.S. 3889 : Part 2A : 1965 Methods for non-destructive testing of pipes and tubes : Part 2A Eddy current testing of ferrous pipes and tubes

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B.S. AU 20 : 1963 Control box for 12 volt cut-out and voltage regulator (exposed mounting)

B.S. AU 31 : 1963 Dimensions of electrical cable connectors for starter battery taper terminal posts

B.S. AU 40 : 1963 Motor vehicle lighting and signalling equipment : Part 1 Side, rear, parking and stop lamps, and direction indicators

B.S. CP 326 : 1965 Protection of structures against lightning

■ DRAFT STANDARDS

AUSTRALIA

989 Sawn unseasoned Eastern Australian rainforest timber (*revision of* SAA Int. 362)

990-993 Milled products from Eastern Australian rainforest timber

995 Polyethylene (polythene) film for construction, industrial and agricultural purposes

996 Polyethylene (polythene) heavy-duty shipping bags

997 Welded or brazed (lightweight) steel cylinders for compressed gases

998 Specification for valve fittings for compressed gas cylinders

999 Plastics containers for transporting liquids (1 to 10 gallons capacity)

1000 Direct-on-line starters

1001 Determination of the structural adequacy of strip and sheet flooring for domestic purposes

1002 Cold-worked reinforcing bars for reinforced concrete (*revision of* AS A85)

1003 Specification for mineral filler for bituminous paving mixtures (*revision of* AS 47)

NEW ZEALAND

D 7685 B Methods of measurement of building works (Parts 13 to 31)

D 8189 Size designations and body measurements for the sizing of men's ready-to-wear apparel (other than shirts)

D 8236 Electric signs

D 8432 Electric food mincing machines (*revision of* NZSS GP24)

D 8433 Electrically driven semi-automatic food slicing machines

D 8471 Barbed wire

D 8482 Galvanised (zinc-coated) steel fencing-wire (*revision of* NZSS 143)

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UNITED KINGDOM

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D 65/12094 Control plug cocks for low-pressure gases (*revision of* B.S. 1552)

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D 65/12287 Tables of approximate comparison of hardness scales (*revision of* B.S. 860 : 1939)

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D 65/12913 Steam sterilizers : Part 4 Small electrically heated steam sterilizers for unwrapped instruments and utensils

D 65/12960 Non-ballistic methods of measuring the resistance to tearing of woven fabrics

D 65/13342 Motor cyclists' eye protectors

D 65/13638 Methods of measurement of performance of domestic electric appliances : Part .. Food preparation machines

■ RECENT PUBLICATIONS OF ISO AND IEC

ISO RECOMMENDATIONS

ISO/R 422-1965 Specification for photographic grade p-methylaminophenol sulphate. P 7. Rs 8·70

ISO/R 438-1965 Method for the determination of the bulking thickness and bulk of paper. P 8. Rs 8·70. A precision dial micrometer with two parallel plane faces between which the paper is placed is used for measurement of bulking thickness from which the bulk is calculated.

ISO/R 443-1965 Marking of aircraft gas cylinders. P 4. Rs 6·55. Recommends use of labels or transfers, with an indication of (a) the degree of dangerousness of the gas depicted with the help of symbols and colours, (b) its name, and (c) its chemical formula.

IEC PUBLICATIONS

IEC Publication 34-1A Supplement to Publication 34-1 (1960) Recommendations for rotating electric machinery (excluding machines for traction vehicles); Irregularities of wave form. 1965. P 8. Sw fr 5·00

IEC Publication 65 Safety requirements for mains operated electronic and related equipment for domestic and similar general use. 1965. P 99. Sw fr 60·00

IEC Publication 68-2-17 Basic environmental testing procedures for electronic components and electronic equipment : Part 2 Tests — Test Q : Sealing. 1965. P 23. Sw fr 15·00. Test Q comprises several different tests intended to cater for the various types of seals found in different components.

IEC Publication 92-5 Electrical installations in ships : Part 5 Transformers for power and lighting, semiconductor rectifiers, generators (with associated prime-movers) and motors, electric propulsion plant, tankers. 1965. P 98. Sw fr 60·00

IEC Publication 92-6 Electric installation in ships : Part 6 Accessories, lighting, accumulator (storage) batteries, heating and cooking appliances, internal commnuications, lighting conductors. 1965. P 51. Sw fr 30·00

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IEC Publication 99-1A Supplement to Publication 99-1 (1958) Recommendations for lightning arresters : Part 1 Non-linear resistor-type arresters. 1965. P 39. Sw fr 24·00

IEC Publication 175 A.C. electric table type fans and regulators. 1965. P 41. Sw fr 25·00

IEC Publication 180 Nominal cross-sectional areas and composition of circular copper conductors for rubber or polyvinyl chloride insulated cables and flexible cords with a rated voltage not exceeding 750 V. 1965. P 15. Sw fr 9·00

IEC Publication 181A Supplement to Publication 181 (1964) Index of electrical measuring apparatus used in connection with ionizing radiation. 1965. P 75. Sw fr 40·00

IEC Publication 184 Methods for specifying the characteristics of electro-mechanical transducers for shock and vibration measurements. 1965. P 37. Sw fr 25·00. It is intended as a guide to instrument manufacturers for indicating the characteristics of their transducers and as a help to users in selecting a particular type of transducer or preparing performance specifications.

IEC Publication 188 Schedule for high-pressure mercury vapour lamps. 1965. P 7. Sw fr 4·50. Prescribes electrical characteristics and dimensions which are necessary to ensure the interchangeability and safety of high-pressure mercury fluorescent lamps.

IEC Publication 197 High-voltage connecting wire with flame retarding insulation for use in television receivers. 1965. P 15. Sw fr 9·00

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The national French mark NF was created in 1938 by the Government. The Association Francaise de Normalisation (AFNOR) is in charge of its management. It is affixed to thousands of articles or apparatus.

The mark NF on a product means: "PRODUCT CONFORMING TO FRENCH NF STANDARDS." Standards express scientifically and precisely the qualities demanded of products. They are worked out and drafted jointly by qualified representatives of producers, users, and Government and local authorities. The French NF standards are ratified by ministerial orders published in its official Journal which can be obtained from AFNOR. All important Government and local bodies demand that NF standards shall be followed in executing contracts made by them. The courts of law refer to these standards and competent buyers base their requirements on them.

NF, thus, guarantees "FITNESS FOR THE JOB". A stew pan marked NF cooks food quickly under satisfactory conditions. A piece of furniture marked NF is strong, its components do not become loose and it has no defective workmanship. The Engineer has no worries with an NF cement.

NF affixed to a product also warrants that the product has been inspected by AFNOR. Its manufacturer has given written undertakings. The product has undergone in the laboratory all the tests prescribed in the standards. Inspections have been made at the place of manufacture and in the trade. A standing committee on which producers and users are represented follows all these operations and is competent to inflict penalties.

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(Journal Officiel de la Republique Francaise — Recommendations and Reports of the Economic Council — Meeting of July 25, 1956.)

Import Substitution

—a recent underlining of a basic Metal Box philosophy

Metal Box set out many years ago to develop new and indigenous packaging materials...at a time when most of it had to be imported. As a result of planned and sustained development efforts, imaginative design and research work, only a little over 16% of the Company's packaging materials requirement is imported today.

The position today :

1. Working closely with domestic tinplate manufacturers, Metal Box develop tinplate suitable for specialised packaging.

2. Metal Box research personnel, working closely with manufacturers of paints, inks, lacquers, coatings, varnishes and bonding materials, have discovered and developed indigenous raw materials for packaging. This has helped replace many items previously imported.

3. Metal Box are now manufacturing can closing and can reforming machines as well as bottle-sealing machinery used by the packing industries. All these were previously imported.

4. For the radio, automotive, electrical and ordnance industries Metal Box manufacture precision components...achieve an annual saving of Rs. 135 lakhs in foreign exchange.

Directions for the future :

1. In view of the present emergency, Metal Box are urgently developing the use of blackplate—or untinned plate as a temporary substitute for tinplate. So that imports of pure tin are minimised.

And, as part of a long term plan, Metal Box are working towards reducing the proportion of pure tin used in tinplate for packaging.

2. Metal Box are striving to replace tinplate in areas where the metal still has to be imported, through research tests and field trials...utilising their own know-how and that of their overseas associates.

3. Another objective being pursued by Metal Box Research and Technical Development is finding effective substitutes for materials that contain imported pure tin. Example: solder.

4. While a reduction in imports of pure tin and tinplate comprises the major area for import substitution, Metal Box's efforts are directed just as urgently towards development of new packaging methods and machinery which will help conserve foreign exchange.

Developing domestic raw materials and equipment has always been a basic Metal Box philosophy. Considerable progress has already been made Yet further self-reliance will require redoubled efforts.

To further this process raw materials must be made available in adequate quantities, at a reasonable price And imports of a few essential items and the know-how to manufacture others must continue So that Metal Box—and indeed, the packaging industry as a whole—can work actively towards progressively greater self-reliance

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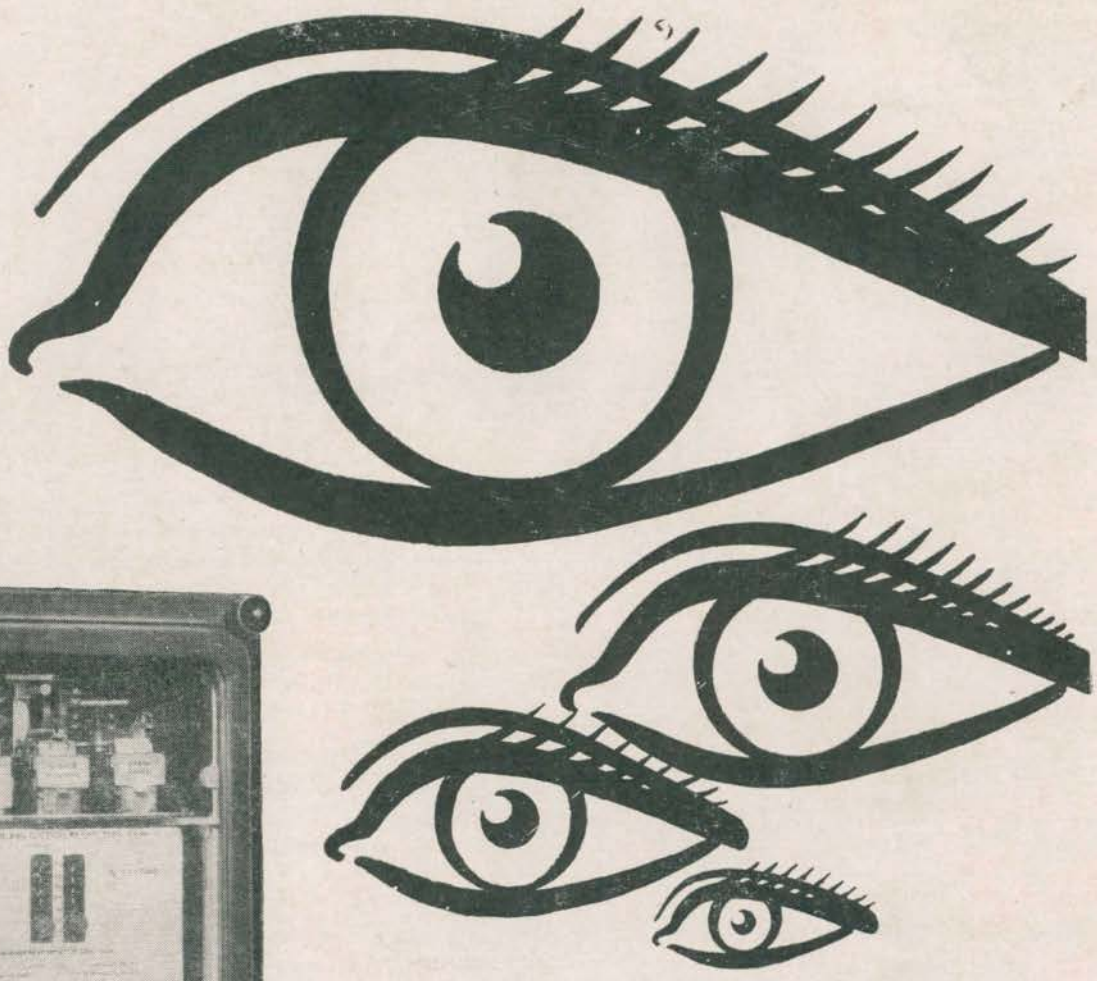
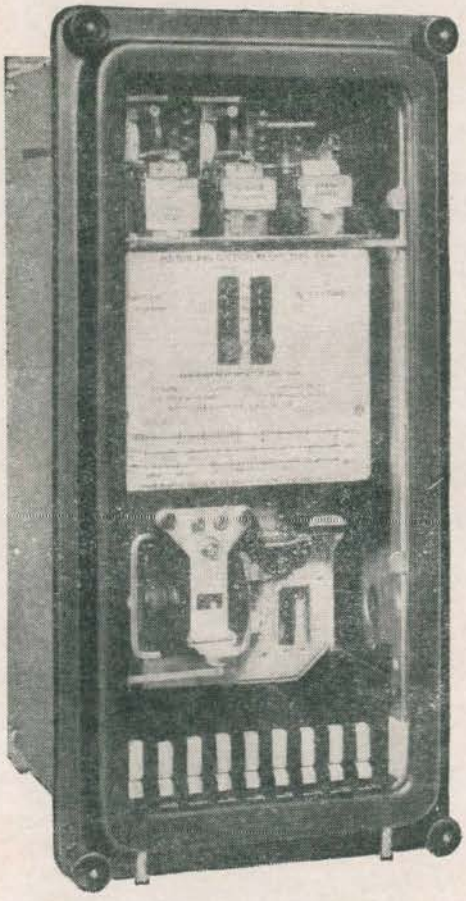
protective packaging

IWTMB 2945A





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