REPORT

OF

CONSTRUCTION PLANT

AND

MACHINERY SELECT GROUP

GOVERNMENT OF INDIA
MINISTRY OF IRRIGATION & POWER
NEW DELHI

REPORT OF

CONSTRUCTION PLANT & MACHINERY SELECT GROUP

D.O. NO. 31/13/73-P & M. II

GOVERNMENT OF INDIA
CENTRAL WATER & POWER COMMISSION
(WATER WING)
Bikaner House, New Delhi 6-3-1974.

K.C. GOYAL
Member (P&P) & Ex-officio,
Joint Secretary.

Dear Shri Patel,

Kindly refer to the O.M. No. 8/8/72-MAT dated 15-5-73 and subsequent D.O. letter of even number dated 30-11-1973 regarding the review of the recommendations of the Construction Plant and Machinery Committee, 1972.

As desired by the Ministry therein the Central Water and Power Commission constituted a Select Group from amongst the nominations received from the States Irrigation and Power Project authorities.

The Select Group conference was held on 25th and 26th February, 1974 and I enclose a Report on the deliberations of the Select Group.

The Select Group have, after detailed discussions, suggested modifications of a few recommendations such as norms to be adopted on schedule hours of construction plant and equipment, life depreciation, repair provision, use rate and hire charges and co-ordination amongst users.

CW&PC agrees with the recommendations of the Select Group.

The recommendations now made by the Select Group may be considered by the Government of India for early acceptance. Once it is accepted the existing Guide Book also would be suitably amended and sent to the Ministry for circulation.

It is also suggested that the recommendations as accepted by the Government of India may be made mandatory so that uniformity exists in the adoption of norms and evaluation of end costs in the Projects.

Yours sincerely,

Sd/-
(K.C. GOYAL)

Encl: as above.

Shri C.C. Patel,
Addl. Secretary,
Ministry of Irrigation & Power,
New Delhi.

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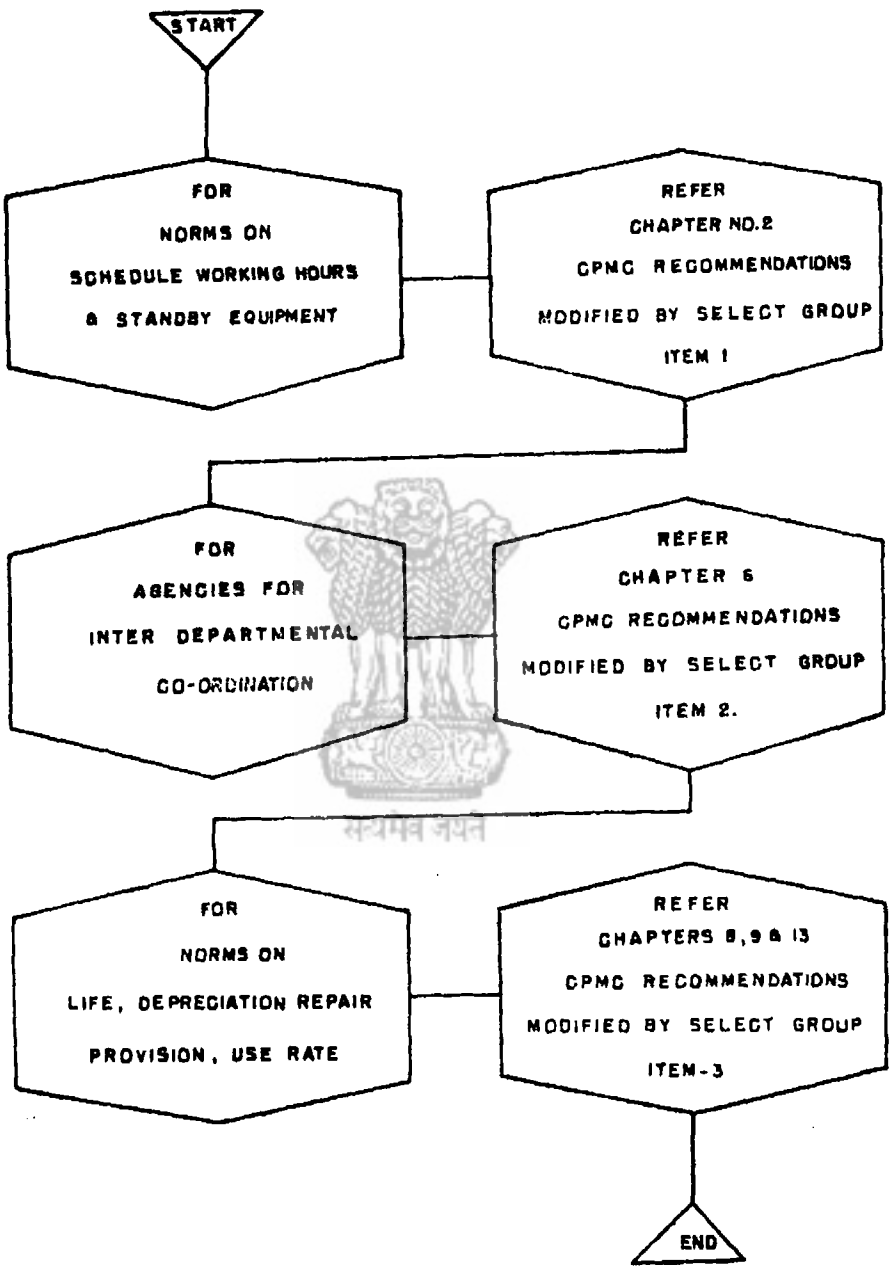
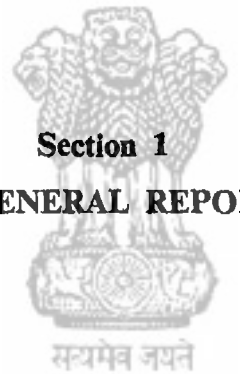
CPM SELECT GROUP RECOMMENDATIONS FLOW CHART





Section 1

GENERAL REPORT

INTRODUCTION

The Construction Plant & Machinery Committee appointed by the Government of India in 1970 for the appraisal of construction plant and equipment in the country, level of utilisation and suggesting norms of life, hire charges, accounting procedure and such other aspects submitted its report in June, 1972 to the Ministry of Irrigation & Power.

After the recommendations were examined in the Ministry and in the Central Water & Power Commission, the Ministry in their letter No. 8/8/72-Mat. dated 15-5-1973 desired that the Central Water and Power Commission hold a seminar to discuss the various recommendations made by the C.P.M.C.

The Central Water & Power Commission, accordingly, requested various States and Central Projects to nominate their representatives for the Seminar.

Due to economy instructions, the matter regarding holding of a Seminar was further considered and in their letter dated 30-11-1973, the Ministry desired that a small meeting of Select Group of users of equipment from different States be convened in Central Water and Power Commission to finalise the recommendations in consultation with them.

Accordingly, the Central Water & Power Commission constituted a Select Group from amongst the nominations received from various States for the C.P.M.C. Seminar.

COMPOSITION OF SELECT GROUP

The Select Group comprised of the following:

(1)	Shri A.S. Kurpad, Director (P&M), CW&PC, New Delhi.	Convener
(2)	Shri G.K. Reddy, Superintending Engineer, M & W Circle, Hyderabad (AP).	Member
(3)	Shri P.C. Parikh, Superintending Engineer, Mechanical Circle, Ahmedabad (Gujarat).	Member
(4)	Shri R.S. Mehra, Superintending Engineer, Loharu Canal Circle, Rohtak (Haryana).	Member
(5)	Shri M.L. Bhat, Superintending Engineer, Mechanical Circle, Lower Jhelum Hydel Project, Baramula (J&K).	Member
(6)	Shri G.G. Puri, Chief Engineer (E&M), Bhopal (MP).	Member
(7)	Shri V.W. Badwe, Superintending Engineer, Mechanical Circle (CP), Central Building, Poona (Maharashtra).	Member

(8)	Shri A.K. Mohanty, Superintending Engineer, Balimela Mechanical Circle, Chitrakonda, Koraput (Orissa).	Member
(9)	Shri Darshan Singh, Superintending Engineer, U.B.D.C. Circle, Amritsar (Punjab).	Member
(10)	Shri A.M. Sharma, Superintending Engineer, Rajasthan Canal Project, Bikaner (Rajasthan).	Member
(11)	Shri P.K. Vedanayagam, Chief Engineer, Parimbikulam Aliyar Project, P.O. Pollachi, Tamil Nadu.	Member
(12)	Shri R.N. Gupta, Superintending Engineer (Mech.), Beas Sutlej Link Project, P.O. Sundernagar (HP).	Member
(13)	Shri M.C. Jindal, Superintending Engineer, Equipment Circle, Irrigation Department, Lucknow (UP).	Member
(14)	Shri N. Sathyamurthy, Deputy Director (P&M), CW&PC (WW), New Delhi.	Reporters
(15)	Shri T. Parthasarthy, Deputy Director (P&M), CW&PC (WW), New Delhi.	

SUBJECT OF DISCUSSION

The C.P.M.C. Recommendations on the following subjects were proposed for discussion in the Select Group meeting:

(1) ITEM—1: Schedule working hours of Construction Plant & Machinery.

(2) ITEM—2: Co-ordination between various users of equipment in Irrigation and Power sector and other sectors.

(3) ITEM—3: Life, Depreciation, Repair Provision, Hourly Use Rate and Hire charges of Equipment.

The relevant material from C.P.M.C. Report, 1972 together with the recommendations was circulated amongst the Members of the Select Group seeking their comments.

A Basic Paper prepared by Shri A.S. Kurpad on the various issued mentioned above was also circulated amongst the Members of the Select Group.

CONFERENCE INAUGURATION

The Select Group meeting was held on 25th and 26th February, 1974 in the Conference Hall of Central Water and Power Commission.

Shri K.C. Goyal, Member (P&P) & Ex-Officio Joint Secretary to the Government of India, Inaugurated the Select Group conference.

The following were present:

(1)	Shri G.G. Puri	Panel Chairman
(2)	Shri A.S. Kurpad	Convener
(3)	Shri R.N. Gupta	Member
(4)	Shri P.C. Parikh	Member
(5)	Shri A.M. Sharma	Member
(6)	Shri M.C. Jindal	Member
(7)	Shri R.S. Mehra	Member
(8)	Shri Darshan Singh	Member
(9)	Shri M.L. Bhat	Member
(10)	Shri N. Sathyamurthy	Reporters
(11)	Shri T. Parthasarthy	
(12)	Shri S.S. Sandhu, E.E., Beas Project.	By invitation
(13)	Shri B.L. Gupta, Deputy Director, CW&PC.	
(14)	Shri J.S. Bakshi, Deputy Director, CW&PC.	

INAUGURAL SPEECH

Shri K.C. Goyal, while inaugurating the discussions mentioned about the hard work done by the C.P.M.C.

He stated that the norms laid down in regard to schedule working hours, life, depreciation of equipment and such other matters have a vital bearing in the operation and maintenance of equipment in setting realistic production targets and estimating cost of works on rational basis. He advised that the norms laid down avoid any indeterminacy and are simple for easy application.

It is essential, he suggested, that the various constraints under which the equipment managers are operating the equipment in our projects are kept in view. He stressed that while the norms laid down should not permit the equipment managers to be complacent and indifferent, which might result in under-utilisation of equipment, it should assist the equipment managers properly motivated for accomplishing the work targets framed on realistic schedule at economical end costs.

He stated that inter-project co-ordination amongst various projects would go a long way in improving availability of equipment on projects and periodical exchange of experience would improve the know-how, operation and maintenance of equipment.

He wished fruitful discussions on the various subjects.

Section 2
DISCUSSIONS OF THE SELECT GROUP

Item 1: SCHEDULE WORKING HOURS OF CONSTRUCTION PLANT AND MACHINERY

Summary of Basic Paper

The factors affecting schedule working hours were discussed at length in the Basic Paper.

While the effect of age of equipment was discussed in the C.P.M.C. Report, the effect of age was not taken into consideration in fixing the schedule working hours and it was suggested that effect of age should also be taken into consideration for realistic planning of work targets.

It was stated that the standby equipment also forms a part of the fleet deployed in operation and hence the average utilisation would be less than the schedule hours.

It was stated that the evaluation of performance of equipment in relation to the working hours may not be an end itself for under-utilisation could as well occur in the job deployment and it is the end product of the job in relation to targets that has any relevance in the assessment of performance.

The evaluation of economics in multi-shift operation as mentioned by the Committee was not considered appropriate for while it is obvious that multi-shift operation connotes intensive utilisation of equipment and thus economical, the need for comparison would never arise because of the restraints on work pattern and orientation which is different in different projects and work locations. Also the total layout on the capital investment on equipment has limitation in relation to total cost of works and so there would have to be due spread in phasing out work for different shifts of operation in such comparison. It was suggested that the peak requirement of equipment should not be substantially higher than the average requirement.

The Basic Paper suggested an action hypothesis for fixing the schedule working hours and performance evaluation.

Discussion

The lacunae in the comparison of economics of various shifts of operation apart, the various issues involved in the multi-shift of operation was discussed at length and it was expressed that aspects such as ambient temperature condition, time available for operational maintenance, the quality of the field repairs and the supervision of the works should also be taken into consideration.

It was felt that while three shifts operation in the cold climate would be possible, in hot and temperate climates three shifts working would not be possible because of the over-heating of the engine and the extra time needed for cooling of the engine.

Besides, the problem in labour management was discussed at length and it was opined that as providing continuous employment to the work force is often becoming a problem, the work force recruited should be an optimum one so as to ensure continuous employment and rehabilitation on completion of project works.

It was also opined that staggering of shift times would be possible only in two shifts operation for better performance of equipment and one shift should exclusively be reserved for effecting proper preventive maintenance schedule.

The concensus was in favour of working in two shifts normally, but only in exceptional circumstances three shifts working could be resorted to.

It was thus decided that the schedule working hours be fixed akin to two shifts working taking into consideration average utilisation factor which has to be applied so as to provide for likely lack of co-ordination in the equipment operation, bottlenecks on haul roads and other such factors involving loss of time in operation of equipment.

It was also opined that while the schedule should be fixed for 200 working days which are normally available in most of the projects, the range of schedule working hours should also be fixed taking into consideration the working days available in some of the projects as these could be fewer than 200 days or in some cases more than 200 days. It was suggested that there should be a proportionate change in the working hours to provide for varying number of working days from project to project.

There was unanimous support to the view that age of equipment should also be taken into consideration while fixing the schedule, as the equipment which has passed first overhaul can never be said to be available to the same extent as a new machine. By taking into consideration the age of equipment also, the schedule drawn up, it was felt, would be more realistic.

With a view to avoiding excessive derating of machines, it was opined that equipment should be broadly classified as new machines and those which have passed first overhaul, and while for new machines the availability should be kept as per the schedule discussed above, the equipment which have passed the first overhaul should be considered available to the extent of only 80% of the schedule hours as drawn above.

There was considerable discussion regarding standby equipment required to be provided, particularly, in view of the fact that Irrigation & Power projects have to depend mostly on indigenous equipment for which the availability is low at present, as the indigenous industry is still in the nascent stage and the technology has not yet reached the level of perfection. It was thus considered necessary to enlarge the provision of standby for various shifts of operation.

The need for phasing out the work such that the peak requirement of equipment is substantially not higher than that of average requirement was discussed in view of the fact that under-utilisation is possible if the peak requirement is kept too high.

It was opined that the performance evaluation should be done against schedules drawn as above, and the efficiency should be worked out for groups of machines. The total schedule hours should not be increased because of standby equipment.

It was also opined that the schedule working hours could be used only as a rough guide in performance evaluation and the performance of equipment has to be primarily evaluated in relation to the production accomplished against the work targets set.

After discussion at length on various aspects as above, the Select Group appointed a Sub-Committee consisting of S/Shri R. N. Gupta, M. C. Jindal, A. M. Sharma and P. C. Parikh to draft the recommendations of the Select Group on the lines suggested during discussions.

The Sub-Committee drafted the recommendations and these were finally approved by the Select Group.

The recommendations as approved have been included in the final recommendations of the Select Group.

Item 2: CO-ORDINATION BETWEEN VARIOUS USERS OF EQUIPMENT IN IRRIGATION AND POWER SECTOR AND OTHER SECTORS

Summary of Basic Paper

As basically the work pattern, the work orientation and above all the administrative and accounting procedures are different in different sectors, it was stated that Standing Committee in which representatives of various sectors would participate confine itself to laying down norms of utilisation of equipment, operational economics, technological development and mutual help in exchange of spares and organisation control, and not be saddled with responsibilities of detailed nature such as plant planning in I&P Projects and liaison with bodies such as DGTD, DGS&D and CCI&E.

It was stated that the pooling of experience could be there if participation from all the sectors using construction equipment besides I&P Projects is ensured and to this extent it was suggested that the equipment Standing Committee should be enlarged.

The existing practice in Plant Planning in I&P projects should be continued.

In regard to liaison with the DGTD, DGS&D and CCI&E on problems falling within their purview, it was suggested that suitable forums such as Standing Committees be constituted in the respective organisations wherein representatives of major users from all the sectors and manufacturers of spares and equipment could participate.

In regard to central co-ordination agency, it was suggested that this agency should co-ordinate the efforts of special cells in major projects, CMUs and other major users, in regard to utilisation of surplus equipment and spares, dissemination of information regarding inventory control, inter-changeability of spares and indigenous manufacture of spares.

In regard to inter-departmental transfer of surplus equipment and spares, a comprehensive procedure for transfer as has been drawn up in the Report of the Study Group for Rehabilitation of Surplus Spares, was suggested to be adopted.

The methodology of fixing transfer price was deferred for discussion under next item.

Discussion

Members of the Select Group showed considerable interest in the formation of Standing

Committee for pooling up of experience, and the central co-ordinating agency for monitoring of spares availability with complementary bodies as special cells in major projects, CMUs and with major users of equipment in other sectors.

It was opined that the meetings of the Standing Committee should be held periodically in various project sites also, so that the Standing Committee could have first hand knowledge of the circumstances obtaining in various projects in the operation and maintenance of equipment.

The action plan suggested in the basic paper was accepted as recommendation of the Select Group with the modification regarding the holding of meetings by the Standing Committees at various projects.

Item 3: LIFE, DEPRECIATION, REPAIR PROVISION, HOURLY USE RATE AND HIRE CHARGES OF EQUIPMENT

Summary of Basic Paper

The merits and demerits of declining balance method of depreciation recommended by the C.P.M.C. was discussed at length, particularly, in the situation obtaining in the Irrigation and Power projects in the operation of construction equipment.

It was stated that the shifts of operation a day a machine is put to either throughout a working season or throughout its life would never be the same. Thus, the indeterminacy likely to arise if the percentage depreciation is linked to shifts of operation a day a machine is put to, was commented upon.

In view of the various difficulties involved in the intensive utilisation of construction equipment during the initial years of project construction, it was suggested that the basic disadvantage of declining balance method in regard to excessive depreciation in the initial years unrelated to use, has to be avoided for it would be a serious burden on works.

It was also suggested that the present straightline method of depreciation was deficient in that it does not take into consideration the physical deterioration and fall in productivity of the machine in the later years.

It was also suggested that the depreciation must be related to actual use connoted by hours and obsolescence connoted by years so that the transfer price of the equipment reflects the intrinsic worth of the machine.

A study on the progress of depreciation by declining balance method as well as straightline method was conducted and a modified straightline method of depreciation was suggested for simplicity and easy application.

The essential feature of the modified straightline method of depreciation is that 50 per cent of the cost of the equipment is depreciated in 40 per cent of its life, and till the residual value of 10% in the remaining 60% of its life.

Thus modified straightline method of depreciation would take into consideration the need for higher depreciation to account for better productivity in the initial years. At the same time, the depreciation is linked to actual use connoted by the number of hours of working and obsolescence connoted by years of use.

The life of equipment as recommended by C.P.M.C. in accordance with the number of shifts of operation the machine is put to, it was suggested, would lead to considerable indeterminacy. Also, there would be interminable accounting difficulties in computing depreciation and transfer price of equipment if the actual use in hours and obsolescence have to be accounted for if varying life figures are adopted in accordance with shifts of operation.

The basic paper suggested adoption of maximum number of years and hours of life recommended by the C.P.M.C.

It was stated that similar indeterminacy arises if repair provision is linked up with the number of shifts of operation a machine is put to. Besides, the factors suggested by C.P.M.C. for taking into consideration the severity of work were observed to be varying excessively as between excellent and severe conditions.

It was pointed out that the repair provision for certain categories of equipment such as Excavators and wheeled tractors is much below the existing repair provision.

It was also pointed out that the escalating prices of spares is often a major worry for the equipment manager for the total repair provision based on book value becomes inadequate in course of time.

It was suggested that to avoid indeterminacy as well as anomaly, repair provision made over the life in hours of any piece of equipment be kept the same, notwithstanding the shifts of operation the machine is put to. The escalation in the prices of spare parts over the years was suggested to be provided for by permitting a notional increase in the book value of the equipment. Also, a leeway was suggested to be provided for severity of job conditions.

It was pointed out that the Committee had not recommended the optimum life of tyres to be adopted. Also there were numerous complaints on the quality of rubber used in the manufacture of tyres and the life of tyres of different makes is different on this account.

It was also stated that the life figures, repair provision, method of depreciation for computing the hourly use rate on the one hand and hire charges on the other are varying.

It was stated that such a variation in the life figures to be adopted in computing the hourly use rate and hire charges would lead to interminable accounting difficulties and that the norms laid down for hire charges should in addition to hourly use rate include additional cost in the form of interest on average capital investment and supervision charges and certain minimum charges to avoid under-utilisation of equipment.

The elements comprising hourly use rate and hire charges and the method of evaluating the same on uniform basis was suggested.

Discussion

Members were of the firm view that indeterminacy arising out of linking depreciation, life, repair provision to shifts of operations should be avoided.

There was considerable support to the view that the excessive depreciation by declining balance method unrelated to actual use in the initial years of the Project's construction would be a heavy burden on works and depreciating the machine unrelated to actual use should be avoided. They expressed that this disadvantage rules out declining balance method, though the concept that the equipment has a better productivity in the initial years as compared with the later years, should be taken into consideration while fixing a new method of depreciation.

Some members were of the view that the existing straightline method of depreciation should be continued as it is simple and easy for application.

Considerable discussions had taken place on the merits and demerits of the declining balance method and on the existing straightline method of depreciation.

Members were convinced that the modified straightline method of depreciation would satisfy the concept of higher depreciation in the initial years to account for higher productivity while at the same time keeping in view that the depreciation would be related to use connoted by hours and for computing transfer price, obsolescence costs also would be taken into consideration.

Members showed reservation in accepting the concept that the depreciation on year to year basis should be calculated both in terms of the actual use connoted by hours and obsolescence connoted by years and they expressed that this might lead to accounting difficulties as the difference cannot be adjusted to works at the end of every year.

As the cost of obsolescence were provided for in the computation of transfer price of equipment, they opined that the depreciation on annual basis should be limited to actual use connoted by hours, and the difference if any between depreciation connoted by hours and obsolescence cost connoted by years at the time of transfer be adjusted directly by charging to the Project.

The concensus was, therefore, in favour of adoption of modified straightline method of depreciation and computing annual depreciation in relation to actual use connoted by hours only while obsolescence cost would also be accounted for in computing transfer price of the equipment.

Members had reservation in accepting the life figures suggested by the C.P.M.C. and also those suggested in the Basic Paper.

They were of the opinion that as the Irrigation and Power projects have to be dependent to a considerable extent on indigenous equipment and the technology has not reached the level of perfection, figures must be fixed judiciously and in this regard they opined that the life figures suggested by the C.P.M.C. are very high and these could never be accomplished.

In regard to repair provision, the Members were critical of the low percentage recommended for some categories of equipment and suggested that the repair provision should be improved particularly because the indigenous equipment need more replacement and repairs, as the metallurgy of component parts needs to be improved.

The life of equipment in years and hours and the repair provision as percentage of cost of equipment was then taken up for discussions itemwise and after considering the present status of performance of each type of equipment, and after considerable discussion, the concensus in this regard was arrived at and the figures of life and repair provision as amended were recommended for adoption.

In regard to the scaling of repair provision, the concensus was in favour of retaining the existing five stage scaling for there is consider-

able variation from project to project in this regard and any further scaling would lead to accounting difficulties.

The various elements constituting the hourly use rate of equipment and hire charges of equipment were discussed at length.

Members were critical of the varying life figures, method of depreciation, residual value and repair provision recommended by the C.P.M.C. and suggested that the norms for computing the hourly use rate and hire charges in regard to the above, should be the same.

Members were agreeable to the view that the hourly hire charges should comprise in addition to all the elements of hourly use rate, annual interest charges on average capital investment and supervision charges. They were agreeable that the minimum hours to be charged for different periods while giving on hire should be as recommended by the C.P.M.C.

General Discussion

Members expressed that the adoption of various norms recommended and ultimately accepted by the Government should be made mandatory for uniformity in the evaluation of performance of equipment and evaluation of end-cost and transfer price and other aspects of equipment.

Members opined that the recommendations to be adopted by various projects, should be brought out in the form of a concise guide book, which could be handy.

Members endorsed the opinion of C.P.M.C. that in the management of equipment, the size of the organisation and the type of administrative control should be determined by the cost of equipment.

Members also endorsed the opinion of the C.P.M.C. that in respect of procurement of spares and central stocking of spares, Central Mechanical Units should play a greater role.

Conclusion

The various suggestions as mentioned above by the Members were then incorporated as recommendations on various items and the recommendations of the Select Group were then approved for submission to the Government of India.

Section 3

RECOMMENDATIONS OF THE SELECT GROUP

Item 1: SCHEDULE WORKING HOURS OF CONSTRUCTION PLANT AND MACHINERY.

(a) *Shifts of Operation*

Two-shifts-working is considered most economical in view of the high cost of three-shift-working due to low availability factor and higher standby equipment required. Further due attention for maintenance and repairs can be given in the remaining available time. Three-shift-working should, therefore, be resorted to only in emergencies for specific jobs and periods. Single-shift-operation should be limited to works which are either located in difficult terrain subjected to vagaries of weather or where these are spread over such as in canal excavation, flood embankments, road works etc., only when it is difficult to provide the supporting facilities for a two-shift-operation.

(b) *Plant Planning*

(i) Schedule working hours in a year with 200 available working days should be taken as below:

	Available Schedule machine hours	Scheduled Product hours
Single shift work/day	1,400 hours	1,200 hours
Two shift work/day	2,500 hours	2,000 hours
Three shift work/day	3,300 hours	2,500 hours

Note 1

Where 200 working days are not available because of peculiar situation existing on account of location of site of works, the scheduled working hours should be reduced proportionately. Similarly if more than 200 days are available, the number of hours, be increased proportionately.

Note 2

For old machines (i.e. after first overhaul) scheduled working hours should be taken as 80% of those given above.

Note 3

The efficiency should be worked out for a group of machines planned for production as contemplated at the plant planning stage and the total schedule hours should not be increased because of standby equipment.

(ii) As Irrigation and Power Projects are, by and large, dependent mostly on indigenous equipment for which the availability is low as the indigenous industry is still in the nascent stage and the technology has not yet reached perfection, it has been considered necessary to enlarge the provision of standby equipment as below:

	Standby as %age of actual Nos.
Single shift . .	10%
Double shift . .	20%
Three shift . .	30%

(iii) As the planning is done on peak requirement, the work phasing within the time during which it is required to be accomplished should be such that the peak requirement of equipment is not substantially higher than that of the average requirement.

(iv) There is need for planned replacement of equipment by inducting new equipment at different stages of project construction. It should, however, be ensured that the new equipment inducted spends at least about 75% of its life on the Project.

(c) *Performance Evaluation*

(i) The performance of equipment has to be primarily evaluated in relation to the production accomplished and work targets set, and schedule hours could be used only as a rough guide. However, for the purposes of efficiency calculations based on hours, schedule available hours is to be taken into considerations. Production targets job wise could as well be drawn at plant planning stage.

(ii) Performance evaluation should be limited only to production oriented machines.

(iii) A comprehensive job deployment schedule should be drawn up and watched all through the year to keep work abreast with schedule.

(iv) Where equipment suffers from recurring mechanical and structural defects or where machines are starved of much needed spares, while persistent action to commission the machine should be taken, the deployment schedules and production targets should be kept under constant review simultaneously.

Item 2: COORDINATION BETWEEN VARIOUS USERS OF EQUIPMENT IN IRRIGATION AND POWER SECTOR AND OTHER SECTORS.

(a) *Standing Committee*

A Standing Committee comprising of major users of equipment in various sectors be constituted for pooling of experience and mutual assistance by periodical discussions on the following:

Equipment .	Norms of utilisation and production, operational economics, surplus utilisation, standardisation, indigenous manufacture and technological developments.
Spares . .	Availability, surplus utilisation, inter-changeability, inventory control, indigenous manufacture.
Management.	Organisation and control.

The Committee be constituted in CW&PC with the Member, CW&PC, as Chairman, and Senior Mechanical Engineers nominated one each from NMDC, NCDC, DGBR, E-in-C Army Hq., and three to four Engineers from major I&P Projects including NPCC as Members. Director (P&M), CW&PC, could be the convener till Plant Planning Directorate is sanctioned.

It is necessary that the meetings of the Standing Committee be held at various Project sites so that the Standing Committee has first hand knowledge of the work pattern and work orientation obtaining in various Projects.

(b) *Liaison with DGTD, DGS&D and CCI&E*

It is suggested that suitable forums such as Standing Committees be constituted in DGTD, in DGS&D and in CCI&E to discuss such problems falling within their purview wherein representatives of major users of equipment, manufacturers and suppliers of equipment and spares could participate.

(c) *Plant Planning in I&P Projects*

The present practice of equipment Planning Committee of Projects drawing up plant requirements with the assistance of CW&PC under the guidance of Member (P&P) might be continued.

(d) *Monitoring of spares availability and co-ordination agency*

An exclusive Directorate in CW&PC and Special Cell in major projects, CMUs and with major users of equipment in other sectors might be created to monitor spares availability and exchange of urgently needed spares, and coordinate efforts in the utilisation of surplus equipment and spares, dissemination of information regarding inventory control, interchangeability of spares and indigenous manufacture of spares.

Periodical meetings of the Engineers in charge of the Special Cells could be convened in CW&PC for exchange of spares besides regular data processing by this Directorate.

(e) *Inter-Departmental transfer of surplus equipment and spares*

The procedure for inter-departmental transfer of surplus equipment and spares might be as in Annexure 'A'.

The life of equipment and the method of depreciation be taken as decided under item No. 3.

The surplus equipment transfer might be on 'as is where is' basis and for the transferee project to judge the health of the machine, the transferer project might produce relevant records on the operational life of the equipment and inputs in the form of overhauls.

Item 3: LIFE, DEPRECIATION, REPAIR PROVISION, HOURLY USE RATE AND HIRE CHARGES OF EQUIPMENT.

(a) *Depreciation and Life of Equipment*

(i) The equipment might be depreciated by modified straightline method starting from the acquisition cost till 50% of the cost in 40% of the life, and till the residual value of 10% of the cost in the remaining 60% of life. Plate I illustrates the method.

(ii) The life of equipment in hours and years might be taken as in Statement 1.

(iii) The transfer value of equipment might be calculated by computing the depreciation both in proportion to the total number of hours worked till the date of transfer to the life in hours as well as the total period elapsed since purchase till the date of transfer to the life in years and whichever is greater might be considered as depreciation of the machine.

(b) *Repair Provision*

(i) The repair provision for various categories of equipment over the whole life might be taken as given in Statement 1. Over and above this repair provision escalation of prices of spares might be provided for.

(ii) Scaling of repair provision might be as below:—

1st Statge	10%	on total repair	provision
2nd Stage	15%	,,	,,
3rd Stage	25%	,,	,,
4th Stage	30%	,,	,,
5th Stage	20%	,,	,,

(iii) The repair provision could vary to the extent of about 20% over and above the indicated provision to meet with severity of job conditions.

(iv) The escalation of prices of spares could be provided for by a notional increase of the book value at 7% per year from the date of purchase, and percentage scaled repair provision applied over this notional book value to arrive at the provision for the stage under consideration. As for instance, if the scaled provision for the 4000-6000 block hours of operation is 20% occurring in the 3rd year since purchase, the repair provision for the 3rd year could then be 20% of (C+21C), where C is the Capital Cost.

(c) *Life of Tyres and Repair Provision*

The life of tyres might be judiciously fixed taking into consideration the factors indicated in the C.P.M.C. Report.

(d) *Hourly Use Rate*

(i) The hourly use rate of equipment might comprise of the following elements:

1. Ownership cost:
   (i) Depreciation.
2. Operational Cost:
   (i) Repair charges;
   (ii) Depreciation and repair of tyres and tubes;
   (iii) Operators & maintenance crew charges;
   (iv) POL and energy charges;
   (v) Miscellaneous supplies.

(ii) The various elements as mentioned above might be evaluated as below:

1. (i) Depreciation:

   As indicated in (a) (i) above over hours of operation during the year.

2. Operational Cost:

   (i) Repairs:

   At relevant scaled provision taking into consideration the escalation of prices of spares and also severity of the job conditions over operational hours during the year.

(ii) Depreciation and repair of tyres and tubes:

Depreciation might be calculated as cost of tyres over the life in hours. The hourly repair provision might be taken as 15% of the hourly depreciation.

(iii) Operators & Maintenance Crew Charges:

As per actual annual cost over the operational hours during the year.

(iv) POL and Energy Charges:

As per actuals. The provision of POL could be checked as per optimum fuel consumption, and 20 to 25% of the cost of fuel might be provided for purpose of lubricants depending on the type of equipment. The electrical energy charges could be as per actuals.

(v) Miscellaneous:

The hourly miscellaneous provision might be kept at 10% of the hourly repair provision. This could be suitably increased for machines using wire ropes, cutting edges, etc., and in adverse job conditions.

(e) *Hourly Hire Charges*

(i) The hourly hire charges might include all the elements as mentioned in hourly use rate of the equipment and in *addition interest charges on average capital investment,* and supervision charges.

(ii) The average capital investment might be calculated by the following formula:

$$\frac{C}{N}(0.514\,N+0.48)$$

Where 'C' is the cost of equipment and 'N' is the number of blocks of 2000 hours each of the life of the equipment in hours.

(iii) Supervision charges can, generally, be fixed by the owner of the equipment or the State and may vary from 10 to 15% of the hourly use rate of the equipment.

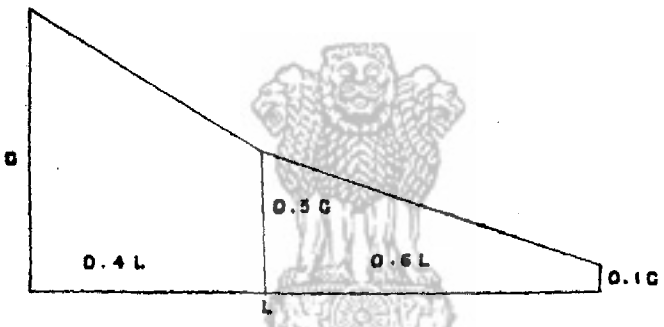
(iv) The minimum hours to be charged for different periods while giving on hire might be as below:

Annual basis		2000 hours	minimum	charges
Monthly	,,	250	,,	,,
Weekly	,,	60	,,	,,
Daily	,,	10	,,	,,

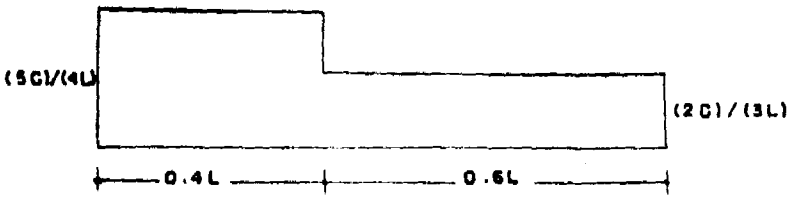
PLATE I.

MODIFIED STRAIGHTLINE METHOD OF DEPRECIATION

1. EQUIPMENT RESIDUAL VALUE DIAGRAM.



2. RATE OF DEPRECIATION DIAGRAM.



3. AVERAGE CAPITAL INVESTMENT

$= C(0.514N + 0.48)/N$

LEGEND:-

C: CAPITAL COST OF EQUIPMENT

L: LIFE OF EQUIPMENT IN HOURS

N: NUMBER OF BLOCKS OF 2000 HOURS EACH IN LIFE IN HOURS.

STATEMENT 1

LIFE & REPAIR PROVISION OF EQUIPMENT

Sl. No.	Equipment		Life of Equipment		Repair Provision (%age of cost of Equipment)	Remarks
	Category	Capacity	Years	Hours		
1	2	3	4	5	6	7
1.	**Excavators**					
	Shovels & Draglines	Upto 1.5 cuyds.	10	12,000	150	
		1.5 to 3.0 (Diesel) ,,	12	15,000	150	
		Above 3.0 (Diesel) ,,	15	25,000	150	
		2.5 to 4 (Electric) ,,	15	25,000	150	
		4 cuyds. & above (Electric)	20	40,000	150	
	Walking Draglines		20	30,000	150	
	Bucket Wheeled Excavators		20	40,000	150	
	Dredger in Fresh Water	Hull	25	..	60	
		Machine	10	..	60	
	Barges	Hull	16	..	60	
		Machine	10	..	60	
	Tugs	Hull	16	..	60	
		Machine	10	..	60	
2.	**Dumpers**					
	Bottom Dumpers	Upto 20 T	8	10,000	140	
		20 T to 50 T	10	16,000	140	
		Above 50 T	12	20,000	140	
	Rear Dumpers	Upto 15 T	8	10,000	140	
		15 T to 35 T	10	12,000	140	
		Above 35 T upto 50 T	12	15,000	140	
		Above 50 T	15	20,000	140	
	Highway Dumpers		8	10,000	140	
3.	**Scrapers**					
	A. Motorised					
	Push Loaded	Upto 10 cuyds.	8	9,000	150	
		Above 10 ,,	10	10,000	150	
	Elevating and Self-Loading		10	10,000	150	
	B. Towed		12	15,000	75	
4.	**Tractors**					
	Crawler	Upto 100 H.P	8	9,000	200	
		Above 100 to 300 H.P.	10	12,000	240	
		Above 300 H.P.	12	16,000	240	
	Wheeled	Upto 75 H.P.	8	12,000	150	
		Above 75 H.P.	10	15,000	150	
5.	**Graders**		10	12,000	150	
6.	**Loaders**					
	Crawler		10	12,000	200	
	Wheeled		10	15,000	150	
	Blet Loaders		16	20,000	70	
	Reclaimers & Stackers		20	30,000	70	

1	2	3	4	5	6	7
7.	**Compactors**					
	Self-propelled Sheepsfoot Rollers . .		10	12,000	80	
	Drawn Sheepsfoot Rollers . . .		8	10,000	70	
	Vibratory Rollers		8	8,000	150	
	Smooth drum rollers		8	10,000	80	
	Smooth drum vibratory rollers . .		8	8,000	150	
	Pneumatic tyred rollers . . .		8	10,000	80	
	Highspeed Compactors . . .		10	16,000	100	
8.	Water Sprinklers		10	16,000	100	
9.	Canal Trimmer and Lining Equipment above 200 cuyds /Hr.		16	20,000	100	
10.	**Drills**					
	Blast hole Drills		10	10,000	80	
	Core Drills		8	8,000	80	
	Wagon Drills		8	8,000	80	
	Tricone rotary Drills		10	10,000	80	
11.	**Compressors**					
	A. Diesel Compressors:					
	(i) Portable upto 300 cfm. . .		8	10,000	100	
	(ii) Portable above 300 cfm. .		10	12,000	100	
	B. Electric Compressors:					
	(i) Portable upto 300 cfm. . .		10	16,000	80	
	(ii) Portable above 300 cfm. .		12	20,000	80	
	(iii) Stationery		20	30,000	80	
12.	Blowers		12		80	
13.	**Cooling Plants**					
	(i) Aggregate Cooling Plant . . (ii) Ice Plant		20	40,000	75	
14.	**Batching and Mixing Plant**					
	(i) Cement handling Batching & Mixing Plant.		18	30,000	75	
	(ii) Transit Mixers . . . . (iii) Agitating Cars		10	10,000	120	
	(iv) Portable Concrete Mixers . .		5	6,000	80	
15.	**Pumps**					
	(i) Diesel Engine driven above 10 HP:		8	10,000	100	
	(ii) Electrical		12	20,000	70	
16.	Well Points		12	20,000	100	
17.	**Cranes**					
	(i) Mobile (Pneumatic Wheeled):					
	4 to 6 Tons . . . . 8 to 12 ,, ... 15 to 25 tons . . . . 26 tons & above		10 12	12,000 15,000	120 120	
	(ii) Crawler Mounted					
	Upto 3 tons . . . . 4 to 10 tons		10	12,000	120	
	Over 10 tons		12	15,000	120	

1	2	3	4	5	6	7
	(iii) Tower Cranes		20	30,000	120	
	(iv) Truck mounted		10	16,000	140	
18.	**Transport Equipment**					
	A. *Heavy Transport Vehicles*:					
	(a) Trucks & Highway Dumper:					
	(i) Diesel upto 3T . .					
	Diesel 3 to 5T . .					
	5T and above . .		10	2,00,000km	140	
	(b) Tractor Trailers :					
	Upto 5T . . .					
	5T to 10T . . .		10	2,50,000km.	140	
	10T and above . .		12	20,000 Hrs.	140	
	B. *Light Transport Vehicles*:					
	(i) Jeeps					
	(ii) Station Wagons . . .			1,60,000km.	140	
	(iii) Cars					
	(iv) Ambulance Cars . . .					
	C. *Aerial Transport*:					
	(i) Ropeways					
	(ii) Cableways		20	40,000	70	
	D. *Rail Transport Locomotives*:					
	Diesel		10	16,000	120	
	Electrical		22	40,000	100	
	Wagons Rail Cars		20	30,000	70	
19.	**Diesel Generating Sets**					
	Upto 50 kva		10	20,000	100	
	Above 50 kva		15	30,000	120	

ANNEXURE A

PROCEDURE FOR TRANSFER OF SURPLUS EQUIPMENT AND SPARES

1. *Surplus declaration—Methodology*

The requirement of equipment should be reviewed periodically so that surplus items can be ascertained at least six months before they actually become surplus.

Equipment actually surplus or likely to be surplus in the near future should be classified in three groups as follows: —

(a) Equipment in good working order.

(b) Equipment which can be economically put into good working order after repairs.

(c) Equipment which cannot be repaired economically or is unfit for further use due to obsolescence or other reasons.

Internal transfers of surplus equipment should be arranged by the State concerned for use on other Projects in the State. Intimation of such internal transfers may be sent to CW&PC in the quarterly returns.

Equipment classified as (c) above, i.e. equipment not repairable economically or unfit for further use due to obsolescence or other reasons, need not be notified in the surplus lists, but may be disposed of by the owning State/Project direct in the best manner possible under intimation to CW&PC.

Lists of surplus equipment at (a) & (b) above, i.e. equipment in good working order and equipment which can be repaired economically, and which are absolute surplus to the State, will be circulated by the State/Project to other States/river valley projects. These list (5 copies) may also be sent to CW&PC for necessary action in the disposal of the surplus items.

The lists of surplus equipment should indicate the following particulars:

(a) Serial Number.

(b) Project identification No.

(c) Particulars of Equipment:

(i) Nomenclature

(ii) Make

(iii) Model

(iv) Manufacturer's Serial No.

(v) Particulars of Engine:

Horse Power,

Make,

Model,

Serial number.

(d) Capacity

(e) Date of purchase

(f) Acquisition Cost

(g) Total No. of hours worked upto date.

(h) Present condition of machine.

(i) Depreciation.

(j) Transfer Price.

(k) Date when the equipment could be released on transfer.

(l) Remarks.

Similarly detailed lists of usable surplus spares with the following particulars would be circulated to various States/Projects:

(a) Serial Number.

(b) Category of Equipment.

(c) Make.

(d) Model.

(e) Cost of surplus spares.

(f) Details of spares:

(i) Part Number.

(ii) Description.

(iii) Quantity.

(iv) Rate.

(v) Amount.

(g) Remarks.

Detailed lists of surplus spares may be drawn up in the ascending order of part numbers so as to facilitate easy identification.

If after circulation of the surplus equipment and spares lists as above, no response is received from any other State/Project within six months of the date of notification as surplus the owning State/Project may dispose of the equipment and spares to its best advantage.

2. *Surplus Equipment—Condition*

It is desirable if the owning State/Project keeps the equipment in satisfactory working order before transfer.

The owning State/Project should keep records such as log books, history sheets for examination of the buyer where necessary.

3. *Book Value*

(a) In case of equipment purchased as new, the book value will be the purchase price including freight, clearance charges, customs duty, incidental charges, transport charges to site, erection charges for the basic machine plus the cost of the auxiliary equipment purchased new or second hand.

(b) In case of equipment procured second hand, the book value will be the purchase price of the basic unit including freight, clearance charges, customs duty, incidental charges, transport charges to site, erection charges plus the cost of overhauls and repairs carried out after it is purchased, but before it is put to use, plus the cost of additional equipment.

NOTE: The Book Value does not include the cost of initial spares purchased alongwith the machine. If additions or improvements are made to increase the utility of efficiency of the equipment the book value may be increased by the amount spent for such modifications.

The book value of the equipment as above shall not be increased to market price or increased by taking the effect of devaluation in case of imported equipment, while the transfer is between Govt. Projects, Departments, Corporations and other such Govt. bodies.

4. *Life of Equipment*

(a) The life of equipment and life of tyres shall be as finalised and accepted by the Government on the recommendations of the Construction Plant & Machinery Committee, 1972.

(b) The life of second hand equipment shall be determined by computing the residual life it had on the day of its earlier transfer, and on the basis of cost of re-conditioning the machine before it was put to use.

5. *Period of Computing Depreciation*

(a) The period for computing depreciation shall be from the date of acquisition till the date of transfer.

(b) The period in years and the working hours of the machine during the period shall form basis for computing depreciation.

6. *Scrap Value*

The scrap value of the machine shall be 10% of the original book value.

7. *Depreciation*

(a) The depreciation of the machines ranges from Book Value to Scrap Value.

Depreciation shall be calculated in proportion to the hours worked to life in hours as also in proportion to the period elapsed since its acquisition till the date of transfer to the life in years and whichever is greater shall be taken as the depreciation of the machine.

(b) The method of depreciation shall be as finalised by the Government on the recommendations of the Construction Plant & Machinery Committee-1972.

(c) The depreciation of equipment and tyres shall be calculated separately.

(d) In case where the machine had worked beyond the schedule life in hours/years, the residual value of such equipment which has been fully re-conditioned and is not considered obsolete by CW&PC will not be taken as less than 25% of the book value in case of diesel powered equipment and 33% of the book value in case of electrically powered equipment.

8. *Transfer Price*

The transfer price of the equipment shall be the sum of residual value of the equipment and residual value of tyres, calculated in accordance with the provision as at 7 above.

9. *Transfer of Spares*

The owning Project is entitled to transfer spares comprising both fast and slow moving to the extent of 16% of the book-value of the equipment. The spares will comprise of fast moving spares upto 10% of the book value and the slow moving spares upto 6% of the book value.

10. *General*

(a) The transfer price of equipment shall be calculated on the book value of the equipment and not on the market price.

(b) The spares shall be transferred at the book value of the owning project and not at the market price.

(c) Storage charges and supervision charges shall not be levied on the transfer price of equipment.

(d) Storage charges not exceeding 3% can be levied on the transfer cost of spares, but supervision charges, however, shall not be levied on the cost of spares transferred.

11. *Period for Taking Delivery*

(a) In case there is no dispute about the transfer value of equipment, the purchasing Project should take delivery of the machines concerned within two months of settling the terms, failing which the owning Project will be free to dispose of the equipment to its own best advantage.

(b) In case there is a dispute regarding the transfer value, the equipment shall be taken delivery of pending arbitration on transfer price, the transfer should not be held up under any circumstances.

12. *Method of Raising Debit*

(a) Two bills will be made out and sent to the purchasing Project. The first bill for 80 per cent of the transfer value will be accepted and paid by cheque or draft by the purchasing Project before taking delivery and the second bill for the balance 20 per cent of the transfer value will be accepted and paid for within three months of the receipt of equipment.

(b) In cases of transfer where prices have not been finally settled at the time of taking delivery and arbitration is called for, the first bill for 80 per cent of the release value will be accepted by the purchasing Project before taking delivery of the equipment and necessary adjustment will be made in the second bill.

(c) In case the awarded price is less than the 80 per cent of the proposed transfer value covered by the first bill, the seller will return the excess payment within three months of the declaration of the award.

(d) In no case should the transfer of equipment be held up on the score of non-settlement of transfer value.

13. *After-Sales-Service*

In case it is desired by the purchasing Project, after-sales-service will be provided, where possible, by the selling Project for a period of three months after delivery is made on an actual cost basis for the work charged staff. Cost of spares and other stores needed during this period will be borne by the purchasing Project.

14. *Arbitration*

All cases of dispute in regard to transfer value will be referred to Member-in-Charge, Plant & Machinery Directorate of Central Water & Power Commission, who will act as the sole arbitrator.

In case of any disp
purchasing projects
mutual agreement, w
possible to be arrive
Central Water & Power Commission will be final and binding on both the parties.

MGIPCBE—S8—3 CW & PC/ND/75—19-2-76—500.