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Issue Paper II

**NATIONAL SUPPORT POLICIES AND ACTIONS FOR HUMAN RESOURCE
DEVELOPMENT IN INDUSTRIAL MAINTENANCE***

Prepared jointly by
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NATIONAL SUPPORT POLICIES AND ACTIONS FOR HUMAN RESOURCE
DEVELOPMENT IN INDUSTRIAL MAINTENANCE

INTRODUCTION

1. Over the years developing countries have made very large investments in capital equipment, which now constitutes a major part of their national patrimonies. It goes without saying that these capital assets must be carefully conserved and maintained if they are to play their intended role in achieving the development objectives of these countries.

2. The focus here is on industrial maintenance. However, it may be pointed out that industrial or industrial-type equipment is used in all sectors of the economy - agriculture; construction; electricity and water supply; road, rail, sea and air transportation; tourism; health services; banking; and administration. Thus all these sectors have a need for maintenance differing from industrial maintenance, if at all, only in relatively minor matters of technique. The issues addressed in this paper are therefore pertinent to all sectors of the economy and are not exclusive to manufacturing industry.

3. The importance of maintenance in the development process cannot be over-emphasised. Poor or inexistent maintenance can be singled out as one of the major factors slowing down industrial and economic growth. The poor performance of industry in a number of developing countries, in many cases, originates from the inadequate maintenance of equipment. This leads to shortened life-span of equipment, unavailability of equipment and low productivity. At the macro-economic level, the consequences appear in terms of a reduced gross domestic product, out-flow of foreign exchange for pre-term scrapping of machinery, excessive importation of spare parts and the importation of goods which should have been produced by the un-maintained equipment, reduced in-flow of foreign exchange due to lower exports and, as a result, deficiencies in the balance of trade and balance of payments. These consequences aggravate the external debt problem of developing countries.

4. In their strategy for accelerated economic and industrial development, many developing countries, have embarked on extensive industrialisation programmes bent on achieving in a short time what industrialised countries had achieved since the industrial revolution. However, while it was relatively easy and quick for them to acquire and build up capital assets, they found out that human resources to manage and conserve their assets took longer to develop and could not keep in step with the requirements created by the many and extended industrialisation programmes of the last three decades. The problem of conservation, or maintenance, of capital assets has been known and discussed for a long time, but it is quite apparent, that developing countries have not yet come to grips with this problem.

5. The North-South Round Table meeting on "Development: the human dimension", held at Istanbul, Turkey, in September 1985 under the UNDP Development Study Programme, concluded that the transfer of financial resources for physical investment had not in itself created an adequate foundation for self-sustained development, and that experience acquired during the period clearly demonstrated that one of the major obstacles to economic development in developing countries was the inadequate attention given to human resource development.

6. The problem of human resource development in the field of maintenance is a particular instance of this lack of attention. This problem has been aggravated by the fact that industrial maintenance is often not sufficiently understood in all its aspects and complexity. Maintenance is simply frequently described as repairs after breakdown, or simple actions to prevent breakdown (lubrication, re-setting of machinery, etc). Yet maintenance in its full sense goes well beyond this limited scope.

7. The objective of maintenance is to achieve the lowest cost combination of life-cycle cost and opportunity cost of production lost through machine unavailability and poor machine performance. Maintenance considerations thus demand attention at all stages of project development - conception of the project, preparation of investment studies and tender documents, negotiation and acquisition of capital goods, design of equipment, construction, erection and operation of plant. The development of human resources in industrial maintenance has therefore to be organised for all categories of personnel involved at each stage in the project development and implementation process.

OBJECTIVES OF A NATIONAL MAINTENANCE POLICY

8. To begin with, do developing countries need a national policy for industrial maintenance? On many occasions industrialised countries have set up national commissions to evolve a national policy on maintenance in order to produce an impact on decision makers in government and industry on the importance and benefits of maintenance. It would appear that these activities have not always been very effective. However, industrialised countries have over the years realised through experience the absolute importance that has to be attached to maintenance, and enterprises do not need prodding by government or national commissions. Further, the extended industrial infrastructure, educational and vocational training infrastructure, the abundance of consulting firms and organisations specialised in undertaking maintenance work, as well as the existence of long-established associations of manufacturers and professional associations and the availability of trained manpower at all levels have reduced the need for national policies for maintenance in developed countries.

9. These considerations may not apply in developing countries. While the maintenance function is one which has to be carried out at the enterprise level above all, many enterprises in developing countries have only a relatively short history and modest experience, and often lack know-how and financial and human resources to organise effective maintenance. They may need support from outside - from governments, chambers and federations of industry, associations of manufacturers, workers' organisations, educational and vocational training institutions, professional associations, consulting firms, etc.

10. A small number of developing countries have formulated national policies for the improvement of maintenance. It appears that this was easier to do in countries with centrally planned economies. But other countries, with market economies, have also formulated national maintenance policies. Results seem to be encouraging in both groups of countries.

11. It is clear that there can be no universal guide for the formulation of national policies for industrial maintenance, as this depends on the system of government, different levels of industrial development, educational and institutional infrastructures and natural endowments resulting in the prominence of different industrial sub-sectors. There are, nevertheless, some common elements which normally would feature in a national maintenance policy.

12. For any national maintenance policy to succeed, policy and decision makers in government, parastatal agencies and institutions, national organisations and in the production and service sectors have to be sensitised about the absolute need for systematic maintenance. Campaigns for the sensitisation of policy and decision makers may be conducted through the mass media, seminars on national or sectoral basis, and the publicising of success stories highlighting results obtained from well-established maintenance systems. Such campaigns are not solely the province of Governments, but also of other national institutions and associations as mentioned above.

13. It appears, however, that a frequent feature in developing countries is a lack of co-ordination among such national organisations which tend to operate in water-tight compartments, resulting in overlapping, wasteful use of human and financial resources, and perhaps gaps in the furtherance of activities to attain a common goal. Another common element in a national maintenance policy would therefore be that of co-ordinating key economic actors and making the best use of available resources. A comprehensive policy for maintenance would cover the following areas:

- Acquisition, design and use of production equipment;
- Organisation and implementation of maintenance activities;
- Availability of material resources (finance, technical documentation, spare parts, tools, measuring instruments, didactic materials, etc);
- Development of human resources;
- Socio-economic and cultural environment.

14. A number of experts advise that the formulation of a national maintenance policy, the coordination among relevant national actors, and, more importantly, the implementation of such a policy may be facilitated by the setting up of a "national maintenance body". Such a body need not be a separate institution, but may be integrated within an existing structure (e.g. a productivity council), and may have a wide representation including representatives of government, industry, trade unions as well as other pertinent voluntary organisations.

15. The functions of such a body may include assessment of the extent of the maintenance problem, review of the effectiveness of national and sectoral institutions, advice to government on the formulation of national support policies and action programmes, and co-ordination of the activities of the different organisations and associations. It may also be involved in organising sensitisation campaigns for the creation of awareness on the importance of maintenance among policy and decision makers in government, in institutional and voluntary organisations and in production and service sectors. This activity may aim at promoting the "spirit of maintenance" at all levels and categories of personnel, and possibly the population at large.

POLICY FOR TRAINING IN MAINTENANCE

16. Within the framework of an overall national maintenance policy, a policy dealing with the training of personnel in all aspects of maintenance is called for. Such a policy may be formulated by representatives of relevant ministries and national institutions, and of industry, labour and professional organisations, meeting under the auspices of an interministerial committee, national commission, or a "national maintenance body" as mentioned above.

17. Priorities have to be set for the training of personnel in maintaining equipment in the key economic sectors - industry, agriculture, electricity and water supply and distribution, transport, etc., in an effort to resolve problems in sectors where they are most acute and which adversely affect general economic and industrial development. Again, priorities may be defined within the various sub-sectors depending on the importance and the needs of such sub-sectors. Activities have to cover also the needs of administration and service industry and the institutional infrastructure. Priorities have

also to be defined and activities phased over a period of time depending on the availability of local resources and the possibility of obtaining external assistance.

18. To start with, an assessment may have to be made of the needs for personnel in the different categories for the various industrial sectors - each category's needs being quantified in accordance with the forecasts of national and sectoral development plans. A training policy for maintenance can then be formulated based on the estimated number, categories, specialities, and levels of manpower needs. Existing facilities and educational and training programmes have to be evaluated, harmonised and strengthened with a view to turning out the required number and quality of maintenance personnel in accordance with the projected needs of industry.

19. In the final analysis good maintenance is the responsibility of management. A national training policy for maintenance should therefore take steps to ensure that the curricula of all relevant higher education institutions which provide the professional training of those who are likely to fill management posts in the future, as well as institutions providing training for practising managers, put appropriate emphasis on the "maintenance dimension" of management.

20. An emphasis on technical and scientific rather than general subjects in educational syllabi would provide the necessary foundation for training in specialised institutes and for in-plant training later on. Case studies undertaken by UNIDO on human resources development in industrial maintenance in 12 African countries show that formal education programmes have a preponderance of general as against science subjects, and that administrative jobs are still considered more prestigious. It is important that educational and training policies be consistent with respect to human resource development programmes for industrial training in general, and for training in industrial maintenance in particular. Effective training for maintenance requires co-ordinated effort on the part of the education system, industrial training institutes, management training centres, industry itself and maintenance specialists and their associations. It has sometimes been suggested that

maintenance engineering may be recognised as a distinct profession. Indeed, professional associations of "maintenance engineers" do exist already in most developed and in some developing countries. Maintenance personnel need good basic technical education and training, and in addition, specific knowledge and experience of the machines and processes which can only be gained during the course of employment. Maintenance managers, supervisors, and engineers furthermore need training in administrative and managerial capacities such as cost and stock control, collection and analysis of informations, etc.

21. A large proportion of the training of maintenance personnel at all levels must be done as in-service training, during employment. This may be organised inside the enterprise or outside, in suitable training institutions. A national training policy for maintenance must take account of this. It should encourage enterprises to set up in-house training programmes and facilities and/or release personnel to follow training courses outside the firm or even abroad. Governments may consider supporting firms which undertake such training programmes through financial, fiscal or administrative measures.

22. Since only large-scale enterprises have the resources to set up comprehensive in-house training programmes, a national training policy for maintenance should ensure that suitable training is available from outside sources. Because some enterprises, small- and medium-scale enterprises in particular, may have difficulty in releasing personnel, this outside training should contain a strong training-of-trainers component. Thus if enterprises can only release one or a few people to attend courses these people will be able to transmit what they have learned to their colleagues when they return to the enterprise.

23. A national training policy for maintenance may cover drawing up curricula for maintenance personnel of all categories and provide for testing and certification. The opportunity to acquire a recognised qualification can act as an encouragement to undergo training, and lead to an up-grading of maintenance as a professional calling.

THE ROLE OF GOVERNMENT AND OTHER NATIONAL INSTITUTIONS IN IMPROVING MAINTENANCE

24. Governments have an important role to play in the formulation and implementation of national maintenance policies and programmes. In the first place there is the need to make adequate budgetary provision for the infrastructure to support such programmes which should be included in national and sectoral development plans. Outlays will be needed primarily for the creation or strengthening of training institutions to satisfy the skilled maintenance manpower requirements (at all levels) of all sectors using industrial-type equipment. If the national policy includes the encouragement of local reclamation and manufacture of spare parts then further outlays on infrastructural services such as engineering consultancy and design centres and materials testing laboratories and advanced training institutes may be necessary. In order to establish priorities for these expenditures in the face of competing funding demands from other government-funded services governments may wish to conduct periodic surveys of the "hidden costs" of poor maintenance (through pre-term scrapping of plant and equipment, loss of production, etc.) in terms of effect on GNP and tax revenues forgone.

25. Governments can contribute to improved maintenance performance by ensuring an adequate allocation of foreign exchange for the importation of spare parts and by streamlining customs and other importation procedures which cause excessive delays in delivery. Governments may also wish to revise customs duties codes which discriminate against the importation of spare parts. Here again, a periodic survey may be carried out to compare the visible foreign exchange costs of liberalised spare parts importation (and possible forgone revenues on customs duties) with the "hidden costs" in excessive stocks of spare parts forced upon enterprises by unnecessary difficulties and delays in re-provisioning.

26. Governments may encourage the local manufacture of spare parts. This calls for the identification of spare parts to be manufactured locally in terms of the required volumes, available technologies, tools and materials and supporting manufacturing facilities (foundry, forge, heat treatment, etc.) and the availability of trained manpower e.g. designing, tool making, machining, etc. A policy aspect which has to be looked into in the local manufacture of spare parts is the question of prices. Sometimes, locally produced spare parts may cost more than the imported ones due to diseconomy of scale. However, this question should also be considered from the point of view that local manufacture saves foreign exchange, does away with ordering and shipping delays, cuts down the volume of spares to be stored, creates employment opportunities and develops local manufacturing capabilities which might in future give rise to the birth of a capital goods industry. Economies of scale may be improved through sub-regional co-operation where different countries may specialize in the production of distinct items for the sub-region.

27. Governments may wish to take actions, through existing small enterprise development programmes or other mechanisms, to encourage small-scale industries to specialise in maintenance services, maintenance contracting and the reclamation and manufacture of spare parts. As well as the provision of infrastructure services described in paragraph 24 above these actions might include financial and fiscal inducements, access to credit for the acquisition of specialised machinery, and marketing assistance.

28. In the educational and vocational training fields, governments have a responsibility to see that adequate policies and programmes are formulated and implemented, and didactic materials developed and made available in order to provide suitable preparation of maintenance personnel in all aspects of maintenance, including training in project design, negotiation and acquisition of capital goods, and the organisation and methods of maintenance. In this respect, the training of women for various maintenance jobs should not be overlooked.

29. Governments may, through publicity, persuasion, fiscal and administrative measures, encourage public and private enterprises to develop and implement proper maintenance organisation and methods, and to provide adequate in-service training for their employees in this field. Publicity and persuasion measures need not be aimed only at the enterprises but could also be for a wider audience with the objective of sensitising the whole population to the need to maintain and conserve physical assets.

30. While governments clearly have a key role to play in the formulation and development of a national maintenance policy they cannot do this alone. As already mentioned, other bodies and organisations can contribute, and indeed must be involved if the policy is to produce the desired results. Such bodies and organisations include employers' and workers' organisations, chambers of commerce and industry, sectoral and sub-sectoral manufacturers', operators' and trade associations, professional societies and associations, and other voluntary organisations.

31. Such organisations can participate in formulating and implementing national-level maintenance policies. By acting as focal points for the concerns of these members and by communicating to the policy-makers the views and capabilities of their members they can help to ensure that the policies formulated are realistic. By communicating the agreed policies to their members through periodic meetings and publications, and by lending the policies the support of their prestige, they can help very substantially in obtaining widespread policy implementation. They can use their influence and communications capability, resources which governments can duplicate only at considerable cost, if at all.

32. Although such institutions do have limited resources, most would have a periodic review distributed to their members which can be utilized as an instrument for dissemination of information and "education" of members to make them aware of the maintenance problem, for the dissemination of guidelines in the management of good maintenance practices and for the publicity of success

stories of firms which obtained good results from systematic maintenance. Many would have sufficient facilities and resources to organize seminars and workshops. Some activities might not involve too much resources, e.g. exchanging appropriate information and knowledge of maintenance management procedures between firms in the same sector, combining training programmes for members where it would be impossible for each member to do it by himself, compiling a directory of members with specialized facilities for maintenance which may be utilized by other members and perhaps arranging the exchange of maintenance managers between firms for limited periods in an effort to up-grade maintenance systems.

FINANCIAL ASPECTS OF MAINTENANCE AND TRAINING

33. As noted earlier, the implementation of national maintenance policies will require certain financial commitments on the part of governments. Part of these outlays will be direct expenditure, such as for the creation or strengthening of training institutions and infrastructure institutions, while others will be in the form of tax revenues forgone. The costs involved must be estimated and budgetary provision made for them at the outset.

34. The role of the Government is two-fold - ensuring appropriate financial budgetary allocation for maintenance and training in its own ministries, institutions and enterprises which should serve as an example to be emulated by private enterprise, and, in giving financial and fiscal support to private enterprises to implement systematic maintenance systems and training. A number of Governments have legislated to collect levies on the basis of salaries to set up funds for approved training schemes by private enterprises including special apprenticeship schemes.

35. Many Governments grant fiscal assistance for industrial training in the form of tax credits for expenditures on training schemes, investment allowances, accelerated depreciation, and favourable depreciation rates which would encourage the purchase and replacement of equipment and spare parts and which would indirectly enhance the maintenance function. Rationalizing the

import duties regime is also very important. Taxing equipment and spare parts unduly is a deterrent for enterprises to modernize and to keep their equipment in good order. Foreign exchange allocation for the importation of spare parts should receive high priority in order not to disrupt production. Financial and fiscal assistance may be made available to encourage the local manufacture of spare parts.

36. Although these costs will be only a very small proportion of total government expenditure they will be concentrated in a sub-group of expenditures, e.g. those dealing with management development and vocational training and education, which is itself usually rather small, and may thus appear as a relatively large proportional (percentage) increase in this sub-budget. They are therefore likely to be challenged by other government-funded services which also feel they have a legitimate claim to increased resources. The proposed expenditures will therefore need to be very well justified by suitable cost-benefit analysis, perhaps based on surveys of the type described in paragraphs 24 and 25 above.

37. Even though such cost-benefit analyses tend to be very favourable many developing countries are hard-pressed to fund even their existing training facilities. Any additional training services will therefore have to be supplied at the minimum possible expense. The "multiplier effect", whereby the people who are trained train others in turn, will have to be fully exploited. Other innovative training methods will also have to be developed, appropriate to the in-service form of training needed for maintenance personnel.

38. Many developing countries do not have people available capable of giving training in maintenance. Suitable training of trainers for maintenance may have to come from outside or through fellowships abroad. This will require foreign exchange, which again is in very short supply in many developing countries. In such cases appeal might be made to the international community, the UN system and bilateral and multilateral donors. Although the budgets

of such donors are more limited than in past years funding can still often be obtained for well-designed projects, especially if it can be shown that these projects have the full commitment of the recipient governments and that they will produce tangible and measurable results in the maintenance field.

Amongst international agencies UNIDO and ILO can be called upon to assist in the formulation and execution of training programmes, and several bilateral and multi-bilateral donors can also provide these services.

39. The World Bank and the regional development banks are other potential sources of financial support for maintenance training programmes which require foreign exchange. Their infrastructure and sectoral development projects normally make provision for training of the associated personnel. Development banks also support programmes aimed at strengthening national training capabilities and institutions. UNIDO and ILO have often collaborated in such projects.

40. Development banks have a role to play in ensuring that the maintenance function and training in maintenance are adequately included in the feasibility studies and cash-flows of the projects that they finance - and this in their clients' and in their own interest - to ensure the success of the projects and the timely repayment of loans. Commercial banks have a similar role when they consider granting short-term credit or overdraft facilities in order to ensure appropriate credit arrangements for the importation of spare parts, consumable stores and other overhead costs including industrial training, especially in maintenance. High interest rates have a detrimental effect on firms which want to implement systematic maintenance systems as high cost of capital may make firms delay excessively the acquisition of equipment and spare parts and limit their expenditure on training schemes.

41. In international bidding for the establishment of projects, competing bidders endeavour to reduce the tender price by covering the primary cost items, namely plant and equipment, and reduce the amount to cover the initial supply of spare parts, technical documentation and training. It may be well to emphasize that the cheapest tender may not be the best, and that the latter items are as important for the success of the project as the former. Also, while external financing through suppliers' credit, export credit guarantee organizations and foreign banks may more easily be available for projects involving large amounts of capital, credit for small amounts to implement maintenance systems and training are normally not available. High interest rates may put external financing out of the reach of many firms in developing countries, or if taken, pose problems in defaulting on repayment and add to the external debt problem.

42. This is where mixed credits, or as they are sometimes called "aid with trade", may be of benefit to developing countries. In such cases the acquisition of capital goods through normal commercial channels (suppliers, export credit organizations, banks) may be accompanied by bilateral aid in the form of financial and technical aid for physical infrastructure, technical support and training. With respect to bilateral aid one might investigate the possibility of donating to developing countries training materials and didactic aids which, though not any more utilized in developing countries because of the high-tech revolution, may still be utilizable in developing countries at the present stage of their development.

43. Assistance by Government institutions or external financiers may be necessary to advise public and private enterprises to enable them to make optimum use of financial and technical assistance to ensure that projects are not under-financed with respect to maintenance and training in maintenance. Maintenance should feature under both capital expenditure (new equipment or replacements, spare parts, tools) and working capital (consumable stores, labour and training costs, consultancy services). Short and long term cash flows should be prepared, taking account of inflation trends. Sinking funds may be established to ensure the availability of cash at the time of replacement of very expensive equipment. Leasing of expensive equipment might also be considered where extraordinary maintenance, technical back-up services and training can be included in the lease price.

INTERNATIONAL CO-OPERATION

44. International co-operation in maintenance and training for maintenance may take place in its north-south and south-south dimensions through collaboration on international, regional and sub-regional basis. This may be considered in the fields of exchange of information on maintenance in all its aspects, provision of training courses, common use of training facilities, establishment or strengthening of engineering design, productivity and maintenance improvement centres, exchange of maintenance managers and other personnel, and the identification and implementation of technical co-operation projects in developing countries.

45. Many developing countries require external financial and technical assistance not only for developing and implementing human resources development in industrial maintenance, but possibly also for formulating national maintenance policies to give a structure to such programmes. Various sources may provide this assistance such as United Nations agencies through their own regular budget or UNDP, as well as multilateral, regional and bilateral agencies. It has sometimes been commented that very often, such assistance is provided for specific projects rather than programmes, and this, apart from creating difficulties in the administration of projects by the national executing bodies, might also bring about overlapping by the different agencies. The strengthening of co-operation and collaboration among United Nations, inter-governmental and bilateral agencies may therefore be indicated in order to make optimum use of scarce available resources. Mechanisms may exist or may be developed at the national/international interface to bring sources of such assistance to act coherently on the maintenance problem. In 1980, the "Joint UNDP/World Bank Energy Sector Assistance Programmes" assisted developing countries to set up and implement their own national-sector plans, policies and programmes. This might perhaps be considered as a suitable model for action in the area of industrial maintenance, including training in maintenance.

POINTS FOR DISCUSSION

Discussions during the Consultation may focus on the following points:

(i) Objectives of a national maintenance policy

The maintenance function permeates all economic sectors and affects industrial and economic growth. Many policy and decision makers in developing countries are not yet sufficiently aware of the absolute need for excellent maintenance practices. The problem of maintenance revolves around human resource development at all levels and in all aspects of maintenance. What should be the role of the government and other national economic actors in promoting a "spirit of maintenance" both in the public in general and among those responsible for the conservation of the national stock of capital assets? Is a national policy in maintenance needed in developing countries? If so, what should be its objectives and priorities? Who should define it? How can it be developed and implemented? What are the constraints? What measures can be taken to overcome such constraints? Would a "national maintenance body" be useful in this? If so, how should it be composed, and what should its mandate be?

(ii) Policy for training in maintenance

Human resource development in developing countries has not kept in step with the manpower requirements of accelerated industrial development. A national policy for training in industrial maintenance has to be based on an assessment of adequacy of the education and training systems to meet the needs of industry. What support policies and actions should be taken at the national level concerning formal education, vocational training and in-service training, in order to rectify any mis-match in quantity and quality between supply and demand for qualified maintenance personnel? Would an assessment of manpower needs in maintenance be necessary to establish training priorities? Who should initiate action in this regard?

(iii) The role of governments and national institutions in improving maintenance

Governments in developing countries have a crucial role to play in formulating and implementing adequate policies and action programmes to improve maintenance through (a) maintaining the physical infrastructure as a foundation for industrial development, (b) the creation of capacities and capabilities in project planning and preparation, design and choice of equipment, negotiation and acquisition of capital goods, and (c) supporting production enterprises in the importation, reclamation or manufacture of spare parts and in organising systematic maintenance and in-service training. What financial, fiscal and administrative measure can be taken by governments in this respect? Which Government bodies should be involved? What is the role of other national organisations in inter-acting with their governments and in providing direct support to production enterprises?

(iv) Financial implications of national maintenance policies

The financial aspect is ever present in considering policies and implementing action programmes. Governments and enterprises in developing countries often lack the necessary financial resources to organise and implement maintenance policies, and train people in maintenance. What policies and actions are called for to rationalise the financial institutional infrastructure to mobilise and allocate resources for the improvement of and training in maintenance? What possibilities exist for external financing of maintenance and maintenance-related training? Is there any possibility to increase such external financing commensurate with the needs of developing countries?

(v) International co-operation

Human resources development in industrial maintenance may be enhanced by sub-regional, regional and international co-operation through the exchange of information and experiences, the establishment/strengthening of specialized training centres, and the identification and implementation of technical co-operation projects. What actions may be taken to bring this about? There are various multilateral and bilateral sources which may provide assistance in this sphere. What mechanisms exist, or can be developed, at the national/international interface to bring sources of such assistance to act coherently on the maintenance problem? Are there any suitable models?



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Corrigendum

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Line 8 should read

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