International Transport Workers' Journal

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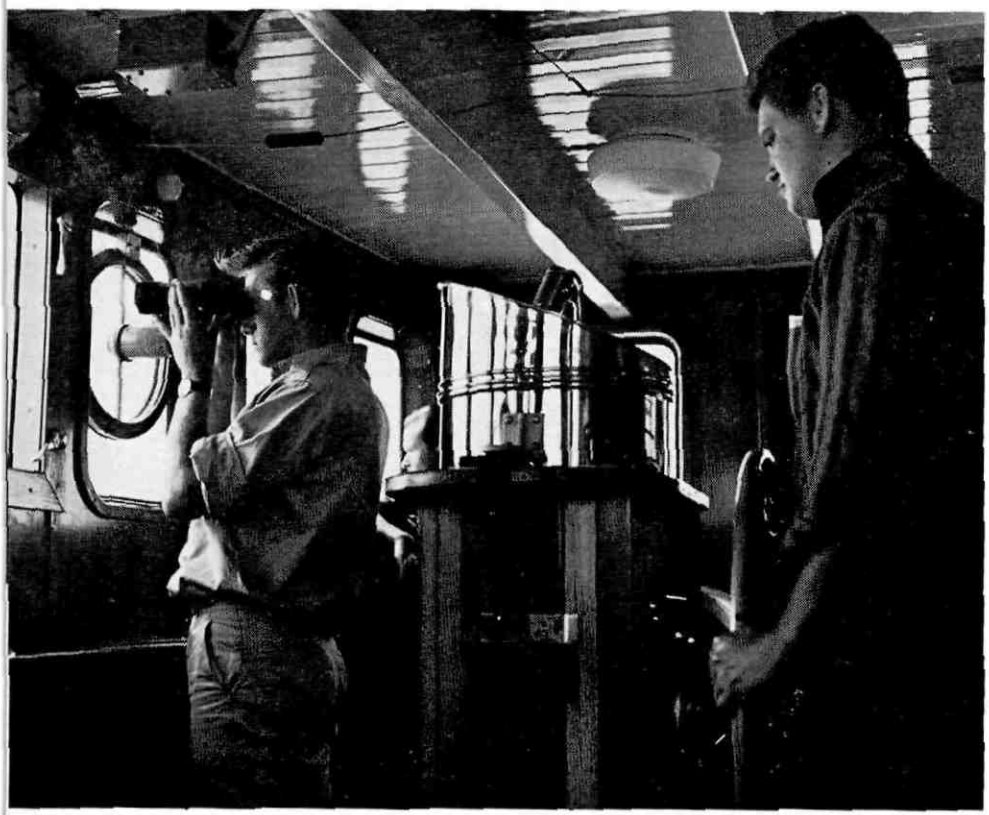
Cover Picture: Dutch merchant navy engineer acknowledges bridge signal (see *Pay, hours and the job* on page 213).

Pay, hours and the job

A scientific approach to pay structure on board ship

ON 16 NOVEMBER 1962 WORKERS and employers of the Dutch merchant navy decided to set up a Committee to inquire into working arrangements and systems of remuneration on board ship and to advise on ways in which these can be rationalized and brought more into line with practice in industry as a whole in the Netherlands. The *Merchant Navy Committee on Pay Structure*, which consists of 5 representatives each from the employers' and workers' sides (the workers' side includes 3 representatives of the ITF-affiliated Dutch Seafarers' and Fishermen's Union — CKV) and an impartial chairman, has still not completed its work, due to delays of one kind or another and to additional tasks not in the original terms of reference which were entrusted to it. An Interim Report, which the Committee issued in April 1964, however, details a number of important conclusions which it had been possible to reach at that stage. The Report contains a formula for a more satisfactory method of fixing seamen's wages and sets out the considerations on which this formula is based. At the outset, it was necessary to determine whether the traditional practice of paying a constant monthly wage, not subject to variations due to time spent in port, etc., should be maintained, or whether a more realistic system should be devised in which wages paid would be the correct remuneration for work actually done during the month in question. On Dutch ships normal working hours at sea are 56 per week: 8 hours per day, Saturdays and Sundays included. In port a 44-hour week is worked: 8 hours from Monday to Friday, 4 hours on Saturday morning. On days of arrival and departure the 56-hour week applies. The same monthly wage rate therefore covers different amounts of work actually performed, and has to be regarded as payment for an average of hours worked.

To gear wages to work actually done in any given month would result in considerable fluctuations in take-home pay, and for a number of reasons the Committee decided that the monthly system would have to be retained in any reorganized wage structure. Objections of a psychological nature (less money in pay packets because of week-ends in port, reduction of 'status' as a result of transfer to hourly pay), labour market difficulties (owners whose ships spent a great deal of time in ports would have difficulty in obtaining crews during full employment) and the administrative difficulties which a system of hourly pay would create (different totals to be computed each month, fluctuations in



The watch system on board ship constitutes a kind of shift system, but in any case, because they are never really away from their place of work, seafarers are called upon to work very irregular hours.

social security deductions) were some of the reasons why the new pay formula would have to accommodate the monthly system.

Nevertheless the new monthly wage rate would have to be *based* on hours of work. It would be arrived at by multiplying the total of working hours computed for remuneration by hourly wages payable. This is in essence the procedure followed in the main by Dutch industry in the structuring of wages. The two factors *remunerable hours* and *hourly earnings*, however, needed to be carefully defined in order that they might provide a means of calculating a stable monthly wage rate.

Remunerable hours

At sea and on days of arrival or departure the normal working day does not generally fall into a continuous period of eight hours, interrupted only by a meal break. In fact, a kind of shift system operates. Although there are technical differences between watch-going at sea and shift working in industry, the Committee felt that the special requirements of work on board ship in this respect called for some form of extra payment. Industrial practice in the Netherlands is to calculate shift bonuses in hours rather than directly in money. Shore industries working in shifts, on a 44-hour week, usually set remunerable hours at 15% above the 44 hours actually worked, counting Saturday afternoons and Sundays as 6 and 16 hours respectively. Thus the total of remunerable hours for shift working in industry comes to $1.15 \times 44 + 6 + 16 = 72.6$. For the purposes of the merchant navy, however, the Committee recommended a shift supplement of not lower than 8%, with 35% to 45% for Saturday afternoon and 75% to 85% for Sundays. The reductions result from the insistence of the workers' members that no maintenance work should be required on Saturday afternoons and Sundays, unless absolutely necessary, while the employers' members felt that the maximum shift bonus would have entitled them to demand any type of work within the hours of work available.

The total of remunerable hours thus agreed upon for the 56-hour week, however, cannot be applied in the case of hours worked while a ship is in port, when the 44-hour week is worked. Thus a formula had to be worked out to provide a total of remunerable hours which would accommodate both systems.

An investigation of ship movements lasting one year, spread over different trades and different companies and covering 401 ships and about 17,000 crew members, showed that the ratio of man-days at sea to man-days in port was 7: 3.

Naturally the question arose of recommending different wage rates for different trades. There were considerable differences, for example, between the coastal and tanker trades in the matter of days spent in port and at sea. After much discussion of this question the Committee decided that special trade rates were inadvisable. The tanker trade provides the strongest argument for such a system, but the implementation of the 7 : 3 ratio in calculating overall remunerable hours would simply justify the retention of the special bonuses which tanker crews already receive.

Thus for 10 weeks' 'mixed service', i.e. 7 weeks at sea and 3 weeks in port, remunerable hours (using averages of the percentage figures given above for weekends) can be calculated as follows:

1 week at sea: normal hours = 44
shift bonus (8% of 44) = 3.52
Saturday afternoon (1.4 × 4) = 5.6
Sunday (1.8 × 8) = 14.4
total of rem. hrs. = 67.52

7 weeks at sea: 7 × 67.52 hours = 472.64

3 weeks in port: 3 × 44 hours = 132

10 weeks' 'mixed service' = 604.64 hrs

Hourly pay

Hourly pay, as the other factor in the calculation of an equitable monthly wage, consists of the basic rate per hour, to be determined by job evaluation, plus appropriate supplements.

A cook employed on a Dutch ship collects his pay from the company's paymaster in Rotterdam. (ILO Photo)

The Committee found two factors in the working conditions of seafarers, as compared with conditions prevailing ashore, which called for the payment of special supplements. Firstly, seamen have not the opportunity enjoyed by workers ashore of enhancing their earnings by such means as piece work or merit rating systems. For this reason the Committee was of the opinion that a supplement should be paid corresponding to the broad average of additional amounts which workers ashore earn by way of individual performance. An *enhancement supplement* of between 10% and 15% was recommended.

In the second place, the seaman's occupation by its nature entails certain sacrifices. He is deprived of the advantages which shore workers enjoy of living in the community. The Committee felt that, though it was not possible to make adequate compensation for such sacrifices in terms of money, some form of supplement should be paid. The actual percentage, being difficult to assess, would however be necessarily a rather arbitrary matter, and the Committee did not make a specific recommendation. The hourly pay factor would therefore be:

hourly basic rate, plus
enhancement supplement and
occupation supplement.

On the basis of these two factors, once the basic job rate has been defined, it is possible to calculate a wage amount for every job corresponding to 10 weeks' 'mixed service'. Assuming that the hourly pay factor amounts to 1.255 × job rate, the formula for 10 weeks' pay is 604.64 × 1.255 × job rate.

From this amount two payments are made otherwise than in money: (a) compensation in the form of free time for Saturday afternoons and Sundays at sea and (b) food.

Working time during the seven weekends at sea over 10 weeks' 'mixed service' was found to be equivalent to $13\frac{4}{11}$ calendar days. Thus the 10 weeks' pay would have to extend over $83\frac{4}{11}$ calender days.

Pay for 365 calendar days would be calculated from the amount finally obtained, which in turn would give the final monthly rate of pay, less 60 Guilders for feeding costs.

Job evaluation

For the purposes of determining the basic hourly rate for each function on board a job evaluation study had to be carried out. A sub-committee, which enjoyed the collaboration of a job evaluation expert from the Dutch Trade Union Confederation (NVV) was entrusted with this task. The experts made altogether 11 voyages on ships of all types and in all trades and submitted reports on each assignment. The results of their studies are now being examined by the Committee. These were not available when the Committee issued its Interim Report, but an advance evaluation of the AB's job had been completed at this stage and the results of this were included in the Interim Report.

This study established the job-content points range in which the AB's function can be classified and listed, in addition the basic job rates for a number of occupation categories in comparable industries ashore. On the basis of these data the Committee recommended a job rate of 2.23 Guilders.* Together with the enhancement and occupation supplements discussed above the hourly pay factor for computation of the AB's monthly wage becomes:

$1.255 \times 2.23 = 2.799$ Guilders

Pay for 10 weeks' 'mixed service' becomes:

$604.64 \times 2.799 = 1{,}692.39$ Guilders

This amount, owing to compensation in free time for Saturday afternoons and Sundays at sea, covers $83\frac{4}{11}$ calendar days. Pay for one year can be expressed as:

$$365 : 83\tfrac{4}{11} \times 1{,}692.39$$

and pay for one month:

$$\tfrac{1}{12} \times 365 : 83\tfrac{4}{11} \times 1{,}692.39 =$$

617.50 Guilders

After deduction of feeding costs, the final recommended monthly rate of pay for the AB is obtained:

557.50 Guilders

* There are approximately 10 Guilders to £1 and 3.60 to $1.

This figure was used by the seafarers' unions in the 1964 negotiations, and the result was an increase in the AB's basic pay of 18%. It had not been possible to complete the evaluations of other jobs on board in time for these negotiations, but the negotiators decided not to wait until the results of this work were available. All other rates of pay were also increased by 18%, with no changes made in the way these rates are interrelated. As has been mentioned, the job evaluation experts only recently completed their task, and the question of how and to what extent the system evolved should be put into practice is still being discussed.

Hours of work and overtime

Questions relating to working hours and overtime have also entered into the work of the Committee.

Previously normal working hours had to fall between 6 a.m. and 6 p.m. on weekdays and 6 a.m. and 12 noon on Saturdays. Any non-operational work, i.e. other than watch-going, catering, etc., done not as overtime at night, on Saturday afternoons and on Sundays was subject to extra payments. In order to eliminate the distinction which this creates between working hours arrangements for watch-going personnel and for the rest of the crew, the Committee recommended that the normal working hours rule should be abolished at sea and that 8 hours' work during any part of a 24-hour period should be regarded as normal working hours. In port, however, the 6 a.m.– 6 p.m. rule was to be retained.

It was felt, nevertheless, that some form of compensation should continue to be paid for non-operational work done outside what was traditionally regarded as the normal working day. *Unrestricted work* supplements were recommended of 100% for Sunday and 60% for the rest of the week. In port any part of 8 hours' work performed outside the normal working day should qualify for a *displaced hours* supplement of 60% per hour. These supplements have since been introduced. They are, however, quite different to overtime. For example, if, while his ship is in port, a crew member works in three different stretches, from 7 to 8 a.m., from 8.30 to 12.30 p.m. and from 6 p.m. to 12 midnight, he has worked a total of 11 hours. His first 8 hours, i.e. till 9 p.m. are his proper working day (four hours on Saturday). The remaining 3 hours are overtime. But as normal working hours must fall between 6 a.m. and 6 p.m., the 3 hours he has worked between 6 and 9 p.m. are 'displaced hours' and qualify for the 60% supplement.

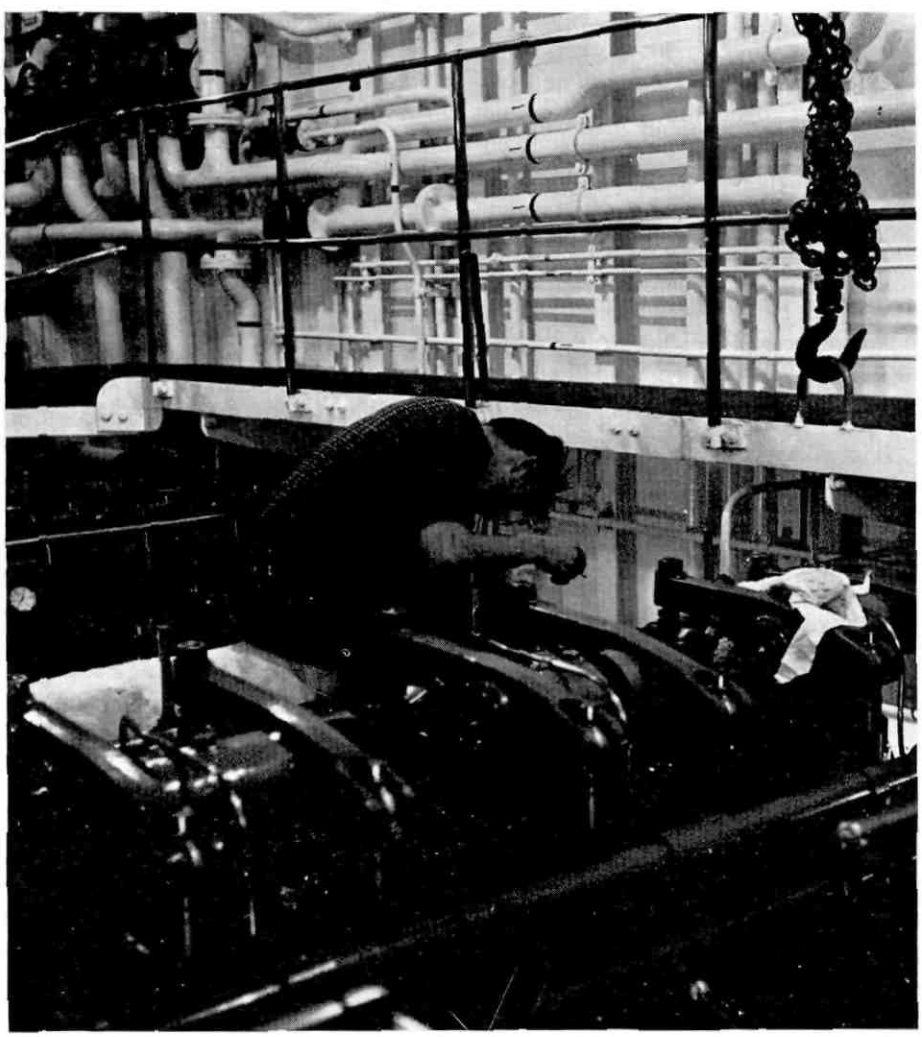
Overtime rates, as distinct from unrestricted work and displaced hours supplements, which were recommended by the Committee on the basis of conditions prevailing in industry and subsequently introduced in the framework of the collective agreement, are as follows:

Mon.– Sat. (noon)	first 2 hrs.	135%
„ „ „	subs. hrs.	150%
Saturday afternoon	all o/t.	150%
Sunday	„ „	200%

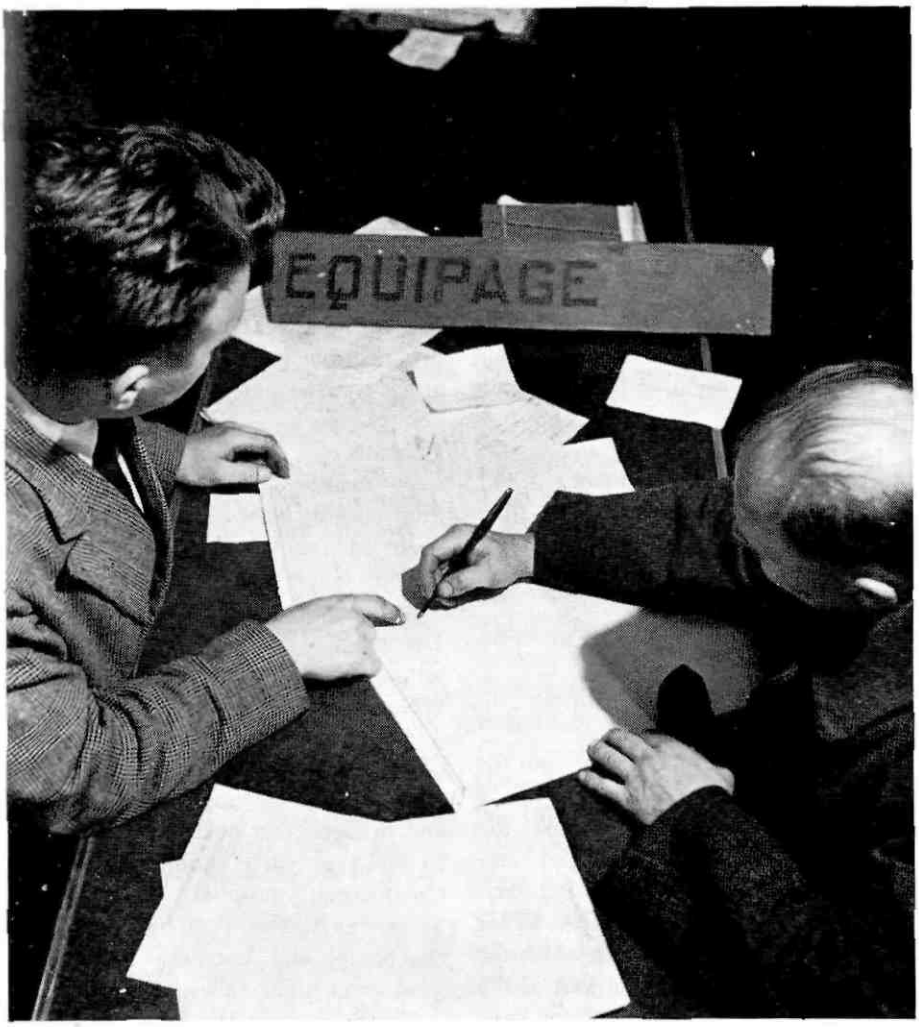
These rates are percentages of the hourly pay figures used as the factor in computing monthly pay.

Reduced manning scales

Since the issue of its Interim Report the Pay Structure Committee has been studying a number of other matters connected with pay and conditions on board Dutch ships. Among these are: watch in port, whether at home or abroad, while actual duties are not required; prolonged service abroad allowance; additional payment for service in tropical regions; continuous employment contracts for all seafarers; and revision of the seniority system.



The Pay Structure Committee recommended that 'unrestricted work' bonuses be paid for non-operational work done during normal working hours on week-ends at sea.



A stoker signs a contract with a new employer. The final results of the Pay Structure Committee's work will ensure that Dutch seafarers are placed on an equal footing with workers ashore. (ILO Photo)

A matter which has contributed greatly to the delay in the appearance of the Committee's final report, however, was the decision of the Government in 1964 to introduce new minimum manning scales, which would enable the shipping industry to take full advantage of the automated processes and equipment offered by modern technology for the rationalization of work on board ship. The unions, in view of the fact that the majority of Dutch ships are of conventional design, were opposed to any drastic reduction of the manning scales in the interests of safeguarding members' interests and maintaining safety of life at sea. As manning scales are the responsibility of the legislature, the unions were not in a position to prevent the Government from yielding to the pressures of the shipowners and going ahead with the revision. But they could and did insist on the incorporation in the new manning laws of provisions to safeguard the seafarers' interests. The owners agreed to the inclusion of such safeguards, afraid that the issue would fall through, due to union opposition. And the Committee on Pay Structure was given the task of preparing a social clause to accompany the new manning scales. This was not allowed to hold up the introduction of the new scales, however. The revised manning scales came into force in May 1965. There was plainly a need for a transitional arrangement to safeguard the interests of seafarers until such a provision could be included in the 1965 manning law. The unions were anxious to ensure that the new legislation should not lead to difficulties in ensuring the safe and efficient operation of ships and to an overburdening of reduced crews. They therefore pressed for a clause in the collective agreement which would lay down strict requirements in the matter of hours of work and rest. Agreement was reached in negotiations on a clause requiring that regular overtime should be avoided, providing for a minimum uninterrupted rest period of 7 hours in any 24-hour period and establishing maximum permissible overtime of 35 hours per man in every two calendar weeks. This clause, together with a provision for controls on the strict observance of the regulations, came into force on 1 March 1966.

It is hoped that the final report of the Merchant Navy Committee on Pay Structure will become available in the not too distant future. In the meantime a great many changes have already been made towards a fairer and more rational organization of the pay structure and the system of working hours on board ship. The final results of the Committee's work will ensure that seafarers are placed once and for all on an equal footing with workers ashore, with proper allowances made for the differences which stem from the nature of seafaring employment. Once this relationship has been effectively established, the men of the Dutch merchant navy will be in a better position to keep pace with the progress made by their land-based colleagues in pay and working conditions.

* * * *

Dental clinics for seafarers

THERE IS A GREAT NEED for dental care to be made more easily available for seafarers. In Porsgrunn, a Norwegian port visited by about 80,000 seamen each year, the merchant navy welfare office reports that often dozens of seamen inquire about visiting a dentist in port. The dentists' association in the area has responded positively to the idea of establishing a permanent dental clinic, and the seafarers' and shipowners' organizations have also expressed

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SOCIAL POLICY IN ROAD TRANSPORT

by B. JONCKHEERE, Secretary of the Committee of ITF Unions in the EEC

An important proposal from the Common Market Commission

THE COMMISSION OF THE EUROPEAN Economic Community has finally adopted a *draft proposal for a system of regulations for the harmonization of certain social provisions in road transport*. This proposal, adopted at a meeting of the Commission on 20 July 1966, was immediately placed before the Council, which on 28 July decided to submit the draft for their consideration to the European Parliament and the Social and Economic Committee.

The draft proposal in question was the result of a decision taken by the Council on 13 May 1965 envisaging the harmonization of improvements in working conditions in the three branches of transport: rail, road and inland navigation.

Of course, since the tragic coach accident which occurred at Limburg-an-der-Lahne, Germany, on 25 July, killing 33 people, the problem of social harmonization in road transport as also the problem of excessive hours of work in this industry have taken on a topicality of which we are painfully conscious.

At its last meeting, the Council of Transport Ministers in the EEC also emphasized the urgent need for regulations which take into account the requirements of road safety. During this meeting, Mr. L. Schaus, representing the Commission, stressed the fact that the proposed system of regulations submitted by the Commission constituted an important step forward in the improvement of road safety. The Commission is becoming more and more aware of the importance of this problem, and it intends in the near future to submit to the Council specific proposals on the question of road safety.

With the ever-increasing interchange of traffic accompanying the growth of exchanges within the EEC, it is clear that the first measures towards the harmonization envisaged in the above mentioned decision of the Council of 13 May 1965 should be taken in the sector in which the problems created by this interchange are most acute: in this case, the road transport sector.

The main concern of the Commission's proposal is threefold:

— maintenance of road safety
— harmonization of progress in working conditions
— harmonization of competitive conditions.

In the process of working out its proposal, the Commission has on a number of occasions consulted the representatives of workers and employers in the road transport industry.

The Committee of ITF Unions in the EEC (Brussels Committee) to which the transport workers' organizations of the Common Market countries belong, have played an active part in these consultations, as also in the drafting of the system of measures proposed by the Commission. The problems dealt with in the Commission's proposal are: minimum age of drivers, composition of crews, driving time, daily rest periods and controls.

Minimum age

The minimum age is fixed at 21. A minimum age of 18, however, applies in the case of goods transport by light vehicles (7.5 tons or less). But at the same time a driver possessing a certificate of competency is qualified to drive any vehicle after the age of 18, provided the maximum authorized weight is less than 15 tons or the crew includes another driver over 21.

Composition of crews

A two-man crew is required for articulated or semi-articulated goods vehicles for which the total maximum authorized weight is more than 20 tons and which cover a route distance of more than 300 km. For the present, and for a transitional period of 2 years, the route distance is fixed at 400 km.

Driving time

Continuous driving time must not exceed 4 hours 30 minutes. After this length of time at the wheel a minimum of 30 minutes' rest is required. Daily driving time is limited to 9 hours for goods transport and 8 hours for passenger transport.

Controls

Crew members must enter into individual control books the different times spent at the wheel and resting, and periods taken up by interruptions, etc. The Council must establish by 31 December 1968 the features of an automatic appliance (tachograph) to replace the individual control book.

At its meeting on 28 July, the Council of Transport Ministers in the EEC, which will be meeting again in October and in December next, has undertaken to make an early examination of the Commission's proposal, that is to say as soon as the European Parliament and the Social and Economic Committee have given their views.

Clearly it is in the best interests of the road transport workers' unions in the ITF Brussels Committee, as well as of the national centres affiliated to the ICFTU European Trade Union Secretariat, to follow closely all discussions on the question and to use all their influence at Community level in order to secure the adoption and earliest possible implementation of the system of regulations proposed by the Commission.

Besides direct approaches and informal contacts with the competent institutions of the EEC, the framework within which the interests of the road transport workers' unions may best be represented is offered by the *joint consultative committees* of the Commission for social questions in the three modes of transport. (The joint committee for road transport is to be set

(Continued on opposite page)

DRIVER FATIGUE AND THE TOURIST TRADE

SINCE THE TRAGIC ACCIDENT near Limburg-an-der-Lahne in Germany, in which a Belgian coach plunged through the parapet of a bridge killing most of its passengers, Belgian coach operators have been under fire from many quarters on account of the excessive hours which it seems their drivers have to work — either because the rules say they must or by virtue of additional casual driving which they must do to earn a decent living.

Days after this tragedy another Belgian coach was involved in a serious accident on the same stretch of motorway. In both cases, it is believed that the drivers went to sleep at the wheel. Early in September two Belgian coaches were involved in collisions in the Munich area; both drivers had ignored the right of way. In court one of them said that he had been driving for more than 13 hours when the crash occurred.

An alarming report appeared in the British press a few days later telling of the experiences of some British tourists who had returned from a holiday in Italy aboard a Belgian coach. Before picking them up, their driver had just brought another party the 900-mile journey from Ostend. The co-driver refused to take the wheel because the power-assisted brakes were not working properly. The passengers claim that the coach nearly plunged from the edge of Alpine roads, hit grass verges at 70 mph and that they had to shake the driver as he dozed off at the wheel. In the Alps the brakes were functioning so badly that temporary repairs had to be carried out. Along the German motorway the driver kept falling asleep. The passengers told of having to force him to stop and of preventing him from continuing until he had had some sleep. They estimated that the three hours' sleep the driver had during this 'forced break' was the first he had had in 1,500 miles of driving.

On enquiries from the press, the firm in question said that a complaint had been received and admitted that there had been a mechanical fault on the coach. Investigations were being made.

The ITF-affiliated Belgian Transport Workers' Union (UBOT) informs us that an agreement has been concluded within the National Joint Council for the road transport industry limiting hours of work. This will be given legal force by Royal Decree.* But until there are adequate controls, unscrupulous employers—and drivers wishing to push their earnings up to the maximum — will find easy ways of beating the regulations. Roger Dekeyzer, the Union's President and a member of the Belgian Senate (also a member of the ITF Executive Board and Management Committee), is proposing to question the Minister of Transport, as soon as the Parliamentary Recess is over, on what measures he proposes to take to ensure greater safety on the road. He has already deposited in the Senate a private member's bill providing for compulsory tachographs on all Belgian trucks, buses and coaches. Dekeyzer has also stated that he intends to press for the ratification by Belgium of the European Agreement concerning the work of the Crews of Vehicles engaged in International Road Transport (AETR). Footnote: *The AETR is an instrument of the United Nations Economic Commission for Europe specifying maximum hours at the wheel and minimum periods of rest for professional drivers who have to drive vehicles outside of their own countries and thus outside the jurisdiction of national regulations. Owing to insufficient ratifications (it must be ratified by 3 adjoining states before it can take effect) the AETR has not yet come into force. Since the Limburg disaster the ITF has intensified its efforts to bring about the necessary ratifications. A special Conference of the Road Transport Workers' Section in October* 1965 *(London) decided that, in spite of plans in the European Economic Community to introduce a separate system of regulations for the Community countries (see Social Policy in Road Transport, page 218) affiliates within the EEC should make approaches to the EEC Commission to persuade France and the Netherlands not to withdraw their ratifications. In a circular sent out to road transport affiliates, calling for renewed pressure for the ratification of the AETR, Hans Imhof, ITF General Secretary, states:*

'In no other sector of transport is such a state of anarchy and chaos tolerated in respect of excessively long working hours and absurdly inadequate rest periods as in long-distance goods and passenger road transport carried out by private firms and, in certain countries, in the operation of taxis. The authorities are all too often blind and irresponsible. This should not, however, prevent us from recognizing and admitting that the authorities and employers are not solely to blame. Professional drivers who are ready to defy national regulations, whether from a desire to make money or simply because the employer says so are, in the present situation on the roads, nothing less than scoundrels and do not deserve the name of professional drivers. It is also true, of course, that the vast majority of such people are not members of trade unions.'

* Hitherto there has been no driving licence in Belgium, although coach drivers do have to pass strict aptitude tests. A law was passed in 1963, however, providing for the compulsory issue of driving licences. Driving licences will now be issued from the beginning of 1967.

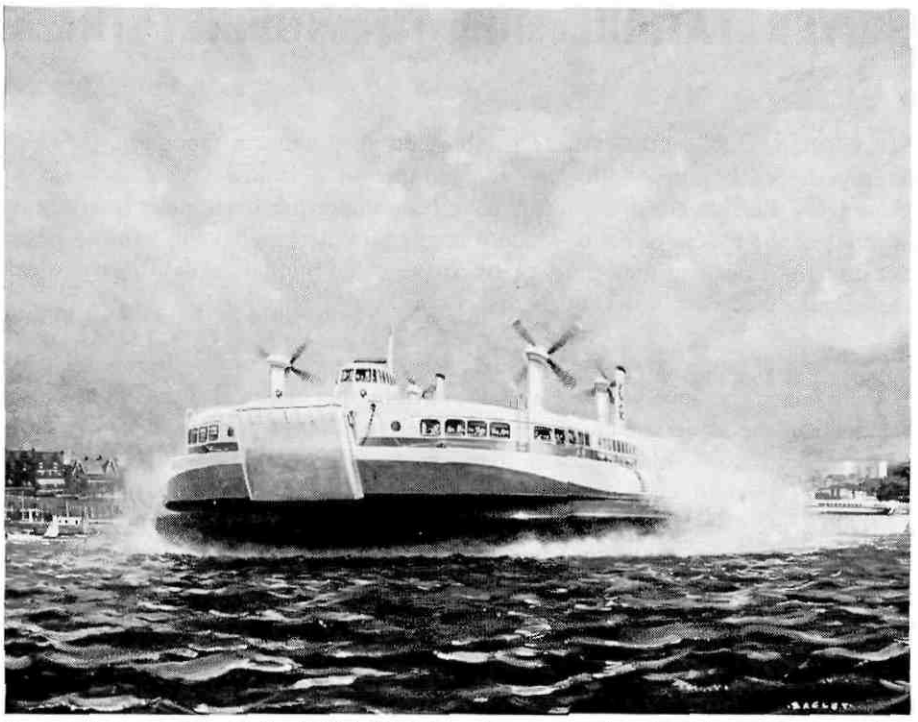
(Continued from previous page)

up shortly.)

In conclusion, it should be noted that the Commission is preparing for submission to the Council a second proposal which will deal with more formidable problems of harmonization not covered by the first proposal. These are: hours of work, weekly resting periods, public holidays, paid leave and overtime systems.

Air cushion vehicles

hovercraft and hovertrains



An artist's impression of the British SR.N4, under construction for Channel ferry services due to commence in 1968. (BHC *Photo*)

The following report on recent developments in a new field of transport, air cushion vehicles, has been prepared at the ITF Secretariat by M. S. Hoda, Technical Officer. He concludes that the perfection of such vehicles and their wider application may be of immense benefit, particularly in developing countries where the terrain is difficult and where conventional transport networks would be extremely costly.

Introduction

One of the recent developments in the field of transport which holds immense possibilities for the future is the development of the Air Cushion Vehicle. This revolutionary vehicle which rides on a cushion of air is able to clear obstacles several feet high and can travel with equal ease across water, mud, slush, snow, ice or desert. The air cushion vehicle is neither a ship nor an aircraft but an entirely new category of vehicle in its own right. It opens up new possibilities in sea transport, being able to use shoal areas and tidal flats which conventional ships cannot, as well as new overland potentialities in opening up difficult terrain where land vehicles cannot pass.

Basic principles

In conventional surface transport there are basically two methods employed for moving a vehicle along a surface. They are either rolled with the help of wheels as in the case of land vehicles, or are made to slide through non-solid media as in the case of water transport. A great deal of power is absorbed in both these systems to overcome tractive resistance or the hydrodynamic drag. Sleighs or ice skates which have a very fast and efficient sliding motion with little effort are exceptions to these principles. Almost frictionless sliding motion in this case is achieved by the fact that a tiny quantity of ice melts due to friction, providing a water lubricant between the skate and ice-covered surface.

This fact led to the conception of an idea that if a layer of air could be produced and retained under a vehicle, the drag and the tractive resistance would become negligible and the vehicle could be moved much faster with very little tractive effort.

Types of Air Cushion Vehicles

Air cushion vehicles can be broadly classified into two main categories: (i) Hovercraft for water, sand, marshy land or other irregular water or land surfaces and (ii) Hovertrains for a network of concrete tracks.

Hovercraft

Civil hovercraft can be divided into two classes: (i) short sea route type, which is already in operation across the English Channel, Elbe estuary of West Germany, between San Francisco and

The British SR.N5, operating on marshy terrain in southern England. Trials have demonstrated the hovercraft's versatility. (BHC *Photo*)

Oakland airports in the USA, as well as in the jungles and marshy land of South East Asia. The big hoverfreighters and ocean-going type of hovercraft are still in the research and development stage.

Hovertrains

Hovertrains, also known as Aerotrains, are still in the experimental stage. France, which has been working on this project for some time, is now running these trains on a four-mile test track for trial purposes. These tracks are of inverted T beam shape with a three-metre wide base, the centre rail guiding the vehicle on the track. In France, air screws have been used for propulsion, while recent development in the UK has centred round linear motors. Electrical conductor rails are inset on both sides of the track base to supply energy to a single three-phase motor mounted in the middle of the vehicle. The train-mounted unit comprises the stator while the three conductors act as a rotor and the propulsive force is derived as the result of magnetic field reaction between the two. It is estimated that these trains will eventually be able to carry about 600 passengers at 300 mph when put into service.

Others

Apart from the above-mentioned major uses of air cushion vehicles in the field of transport, they can also be used to assist the transport of heavy loads over weak bridges and mud roads. A built-in hover unit in a conventional vehicle can be brought into use when required to take some of the weight off the wheels and spread it over a wider area. This helps a truck to operate in wet and waterlogged conditions where normal trucks are likely to bog down.

Such vehicles can also be used for spreading fertilizers and weed killers as the low bearing pressure between the wheel and the ground does not compact the soil — an aspect which is important to farmers because seeds cannot germinate in heavily compacted soil. Other potential uses of air cushion vehicles are mobile clinics and rescue craft.

Technical features

Air cushion vehicles ride on a cushion of air produced by a low-pressure air pump which creates a pressurized chamber under the vehicle, thereby lifting it off the ground. A flexible nylon or rubberized skirt around the periphery of a hovercraft helps to retain the air cushion while the vehicle is in motion, and therefore it is able to clear obstacles several feet high.

Three major factors taken into consideration in designing an air cushion vehicle are:

(i) Development of air cushion suspension system;
(ii) Development of propulsion system for the particular need of hovercraft;
(iii) Development of operational control system.

Air cushion suspension system

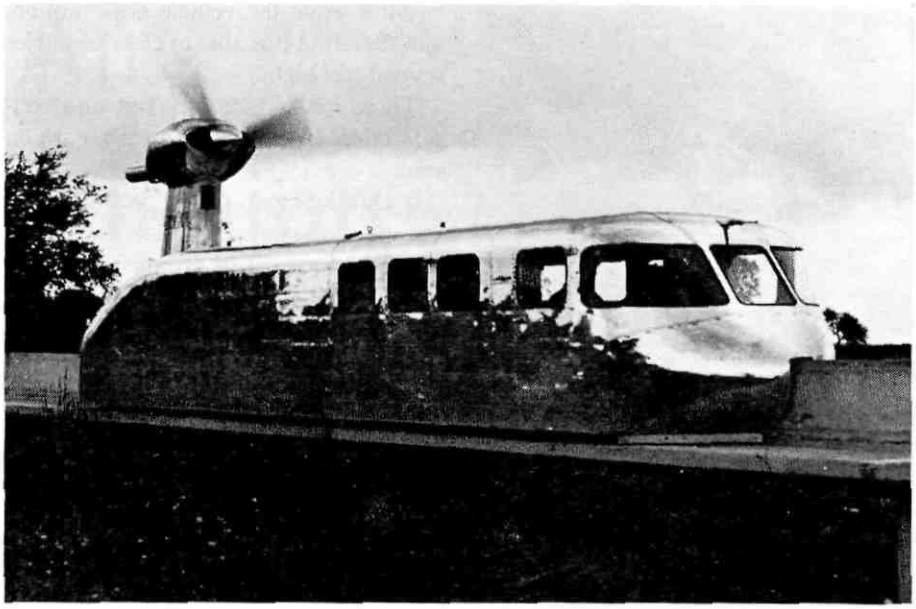
The function of the air cushion is to reduce the hydrodynamic drag and tractive resistance, thereby providing a very smooth and efficient sliding motion as well as a suspension system which gives passengers a comfortable, vibrationless ride.

The lift, as already stated, is provided by a low pressure air pump which creates a pressurized chamber under the vehicle, lifting the vehicle off the ground.

During the early stage of development, peripheral jets of high-pressure air were used to retain the pressurized chamber. This, however, could not solve the problem of clearing obstacles which every moving vehicle is liable to encounter. After considerable reflection, these have now been abandoned in favour of a flexible convoluted skirt and internal membrane. The flexible skirt is one of the most important components of the suspension system, which demands light-weight material and a new philosophy of 'flexible engineering' in order to provide a high rate of response to irregularities and obstacles several feet high.

Development of the flexible skirt has helped in saving a great deal of energy to create lift by cutting off wastage of air due to peripheral jets. Recent incidents of hovercraft overturning have called for further improvement in skirt design to give the vehicle a greater stability while keeping resistance to the minimum.

In the case of hovertrains, laying a special track makes it possible to eliminate one of the most difficult problems inherent in a hovercraft, the



The hovertrain protoype developed in France by the Société d'Etudes de l'Aérotrain has already covered 2,000 miles, and has carried 1,250 passengers. (Photo: Sté. Bertin)

problem of clearing obstacles. However, a small flexible skirt about 20 cm. high is provided to allow for the clearance of any chance obstacle, but the lifting force required is considerably reduced.

Propulsion

Several means of generating thrust to move the air cushion vehicle have been devised, e.g.:

(i) Reaction arising from change of momentum of non-solid elements, such as water and air screws, water and air jets, and jet engines;

(ii) Force generated magnetically or electrostatically, e.g. linear motors;

(iii) Direct reaction on the solid surface of the earth, e.g. wheeled vehicles on rail or road assisted by air cushion lifts to reduce the drag.

The amphibious character of the hovercraft demands a choice of propulsion which could be used both in water or land. Water screws or water jets, although efficient means of propulsion, cannot be used once the vehicle is on land. Therefore, the choice has mainly centred on the use of air propellers or air jets. This has, however, led to some difficulty because, to provide sufficient thrust for a large craft, many air screws are required, resulting in complex gear boxes and transmission systems. Jet engines may provide the eventual solution.

In some models of hovercraft there is an integrated lift and propulsion system. In these craft, four fans operate in two volutes and their flow output is directed by a splitter plate into the cushion and the propulsive jets. This had the disadvantage of making less power available for propulsion. Recent changes have completely separated volutes and now two forward fans provide cushion lifts while two aft fans are used for propulsion.

Power derived from the generation of magnetic or electrostatic force such as by means of a linear induction motor can only be used in the case of hovertrains which move on a fixed track. Electric conductor rails are laid down on both sides of the track base and energy is collected through collector shoes which feed the equipment for lift as well as for propulsion. This method of propulsion by linear motors is in fact ideal for hovertrains. French engineers who used airscrews for the propulsion of hovertrains achieved braking by pitch reversal of the propeller, giving negative thrust.

Special purpose trucks with built-in hover units still use wheels for moving the vehicle. The air cushions help them to take a greater proportion of weight off the wheels, thereby helping in transportation of heavy weights like powerhouse equipment over weak bridges or along mud roads. The movement is achieved by wheels whose drag is reduced by air cushions as they spread the load over wider areas.

Operational Control

The degree of precision of control of a hovercraft depends mainly on the operating environment. Due to higher speed achieved in these vehicles the likelihood of collisions in bad weather increases and the control system should therefore be such as to avoid these possibilities. A greater degree of control is required when the hovercraft approaches a terminal, due to change of surface from water to sand, or mud or solid ground. A form of stable and mobile surface contact, possibly steerable wheels, becomes necessary in these circumstances.

An automatic guidance system along with powered and steerable wheel units may be the ultimate feature of hovercraft.

Hovertrains pose no problem of control and guidance as they travel on fixed tracks and the usual railway signalling system may be used in this case. Derailment is virtually impossible in hovertrains.

Advantages

One of the great advantages of air cushion vehicles is that they are capable of travelling on any terrain, which may not be possible for any other surface vehicle.

They can travel on ice-blocked canals, lakes, snow fields and deserts. With the help of the flexible skirt, they can cross choppy sea or rough terrain, and are in a position to clear marshland with gullies several feet deep or ride over saplings and thorn bushes almost 6 ft. high. Recent experiments have shown that they can drop down from eight-foot sand cliffs at a great speed. In fact hovercraft can replace motor vehicles in the absence of roads or boats where rivers are congested with tropical vegetation or shallowed by sheets of ice. They can ride with equal ease over swamps, estuaries, prairies and savannahs.

In places like the marsh centre of Australia, the dusty plains of Nigeria, the swamp of Northern Canada, the frozen plain of Antarctica, the hovercraft is capable of revolutionizing transport.

Economic Factors

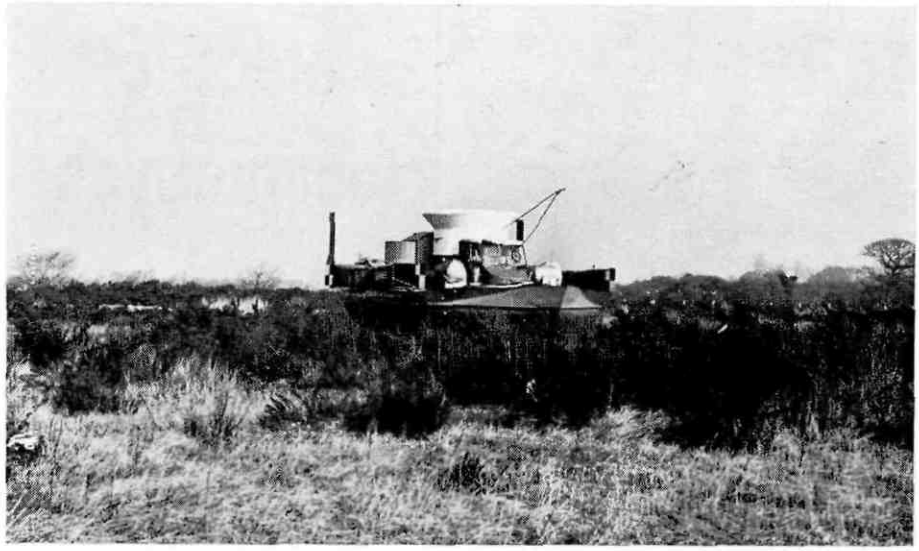
A great advantage which hovercraft have over ships and aircraft is that they need no docks or airports. A solid concrete platform is all that is needed to serve as a terminal point. The auxiliary expenses are therefore very small. Due to greatly reduced bearing pressure between vehicle and ground or support, there is also a great saving in the requirement of tractive effort and motive power. In a conventional ship, a great amount of power is used in parting the molecules of water by the ship's hull in its forward motion. A study of hydrodynamics shows that it is possible to do so only up to a certain speed, after which the ship encounters the 'water barrier' which becomes almost impassable. The hydrodynamic drag associated with water disturbance and displacement in these conventional vessels is overcome by the air cushion, thereby achieving much higher speed with little effort. Similarly it has been estimated that a network of tracks for hovertrains will cost far less than those for conventional trains. Great economy is also achieved in the motive power as the tractive effort required to move a hovertrain is far less than that of a conventional train. Higher speeds (about 300 m.p.h.) will make it quite competitive with internal air flights, and it would be possible for the passenger to travel in absolute comfort because of the absence of normal train vibrations, with maximum safety since derailment is virtually impossible.

The simplicity of maintenance resulting in great saving is another big factor. In a conventional train, the dynamic interaction between wheels and rail cause a great deal of fatigue and wear in all moving and suspension parts, demanding high maintenance costs. In hovertrains the air cushion suspension would eliminate this cost.

Concluding Remarks

Air cushion vehicles are extremely interesting developments in the field of transport and have a very bright future ahead of them. They will bring direct and comfortable travel to many wild places where in the past there has been no single answer to the transport problem — a matter of considerable importance to developing countries.

No longer will semi-liquid marsh, inundated sand, broken sea or river ice or desert expanses remain simply barren spaces, for air cushion vehicles will make them potential thoroughfares for the benefit of mankind.



Above: *The SR.N1, in its fully developed form, easily negotiates gorse and scrub at a British Army training centre in southern England* (BHC *Photo*). Below: *The French experimental hovertrain, following a period of indoor static tests, reached speeds of up to 120 m.p.h. along a special track built for it just south of Paris.* (*Photo:* Sté. Bertin)

75 years of electric locomotives in Switzerland

SEVENTY-FIVE YEARS AGO the first electric locomotives in Switzerland were introduced on the Sissach-Geltenkinden and Grütschalp-Mürren line. The Swiss Museum of Transport has celebrated this anniversary with a special exhibition which shows clearly the enormous technical developments which have taken place since that time in railway operations generally and in the field of locomotives in particular.

Three years after the opening of the first public electric street railway in Switzerland, the Vevey - Montreux - Chillon tramway, the first electric locomotive started service on the Sissach-Geltenkinden (SG) line on 18 May 1891. Whilst ordinary tramcars ran on the Vevey-Chillon tram line, it was considered necessary for a proper locomotive to be used on the SG line because gradients of 15/1,000 and the expected passenger and goods traffic would demand higher tractive power. The men behind the SG project weighed the question of using electric power very carefully. They could not easily use the existing electric line for comparison purposes since this only involved the operation of single light wagons on almost level track. A strong inducement was the existence of domestic water power which could with advantage be harnessed to produce electricity. However, this was not sufficient, as was to become clear all too soon. Scarcely had the cold weather arrived when the quantity of water diminished to a degree which made it impossible to maintain sufficient power to keep the line running. When voltage was reduced it was still possible to get the train over the mountain if the passengers got out and pushed! But when the water flow ceased traffic came to a standstill. The management was therefore obliged to use two alternating steam locomotives, which were followed in 1898 by a third. Winter services were then kept going by the use of these originally rejected engines, which of course substantially affected the financial situation.

However, during the times when electric power could be used, the Oerlikon locomotives were put to useful service. The advantages of locomotives were fully exploited. In the end they were praised for their greater safety: 'The engineer can devote his whole attention to the track before him and to handling the locomotive, since he is no longer hampered by the platform passengers; the equipment and controls are also out of reach of the passengers.'

If the handbrake was not sufficient, it was possible to use reverse power, and this enabled the train to halt within 20 metres from the maximum speed of 18 km/h.

The first Swiss electric locomotive has unfortunately not survived, but the engine from the Grüschalp-Mürren line, which dates from the same year, has been preserved.

The opening of the Grütschalp-Mürren line was delayed by damage to a coach during trials, and effective operations began on 14 August 1891 instead of on 1 July as originally planned. In order to conquer the gradient between Lauterbrunnen and Grütschalp a funicular line was installed, whilst the second section from Grütschalp to Mürren was equipped as an adhesion line with a climb rate of 50/1,000. The funicular was operated on the gradient by means of water ballast. It was up to the conductor to exercise considerable skill and judgment in discharging the water ballast so as to maintain a fairly constant speed.

Another interesting little story from the early days refers to a small power station by the river from which the Mürren line took its power. At this point the magnetic field was so strong that watches had to be removed and even knives were sometimes pulled out of men's pockets. This station was used until the year 1928, and even until 1951 was used in emergencies. Unfortunately the equipment was not preserved for posterity.

Coming up to date, it is clear that a rebirth of the railways is under way. The Swiss Federal Railways are now less concerned with traction techniques than with ways of making rail travel more comfortable and more economical. New types of locomotives are being introduced for traffic of three different types: heavy express trains on level terrain; light expresses and passenger trains; and expresses and goods trains for the Gotthard and Simplon routes and goods trains on level terrain.

Looking into the future, we can see a time when unmanned trains will be in use. But the speed with which this happens depends on a number of factors, not least on production costs and economy of operation. Meanwhile, automation can do a lot to improve safety and punctuality and make the

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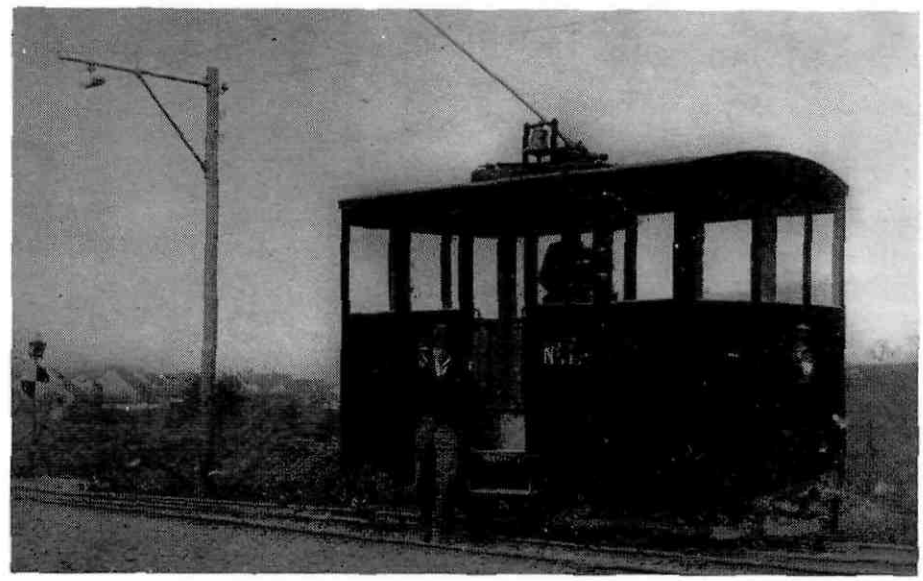
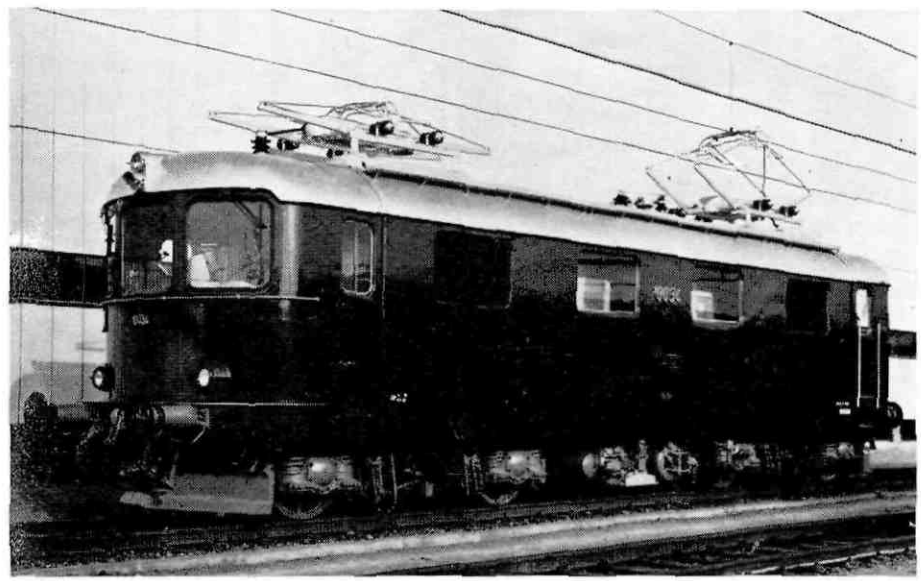
(Continued from page 217)

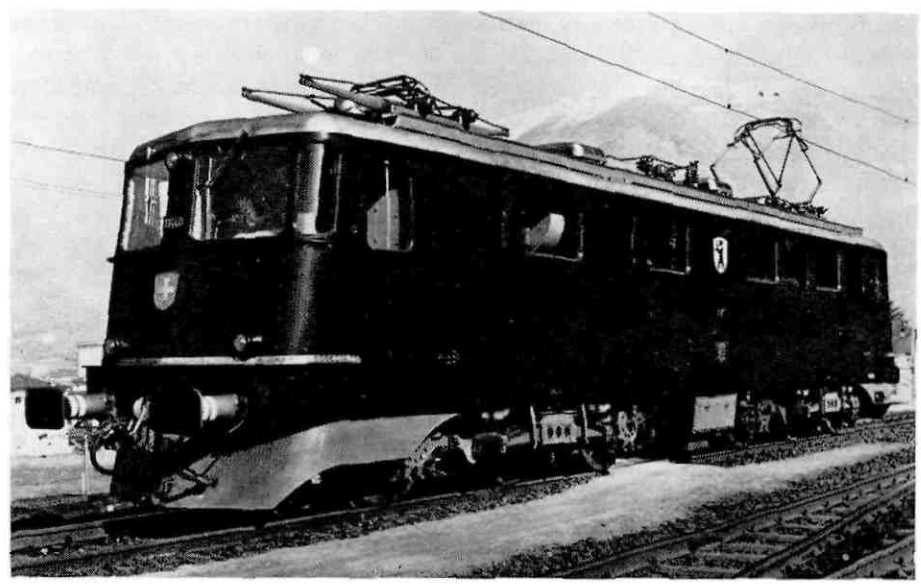
an interest. A clinic of this kind would be open to Norwegian and foreign seamen and to students at the seafarers' schools. At the moment no concrete plans exist, and clearly it would cost a lot of money. But the idea is worth pursuing, and the welfare office hopes to be able to realise its aim.

best possible use of available track. The SBB is working closely with industry to develop a workable system of transferring information from the ground to the train while it is en route. The solution being sought at present involves a cable laid in the track which would transmit and receive electromagnetic messages with high coded frequencies. The corresponding apparatus would be installed in the locomotive. This idea has the advantage that only limited work on the permanent way is involved and the numerous tunnels need cause no interruptions in communications. Such a system would lay the groundwork for future fully-automatic trains.

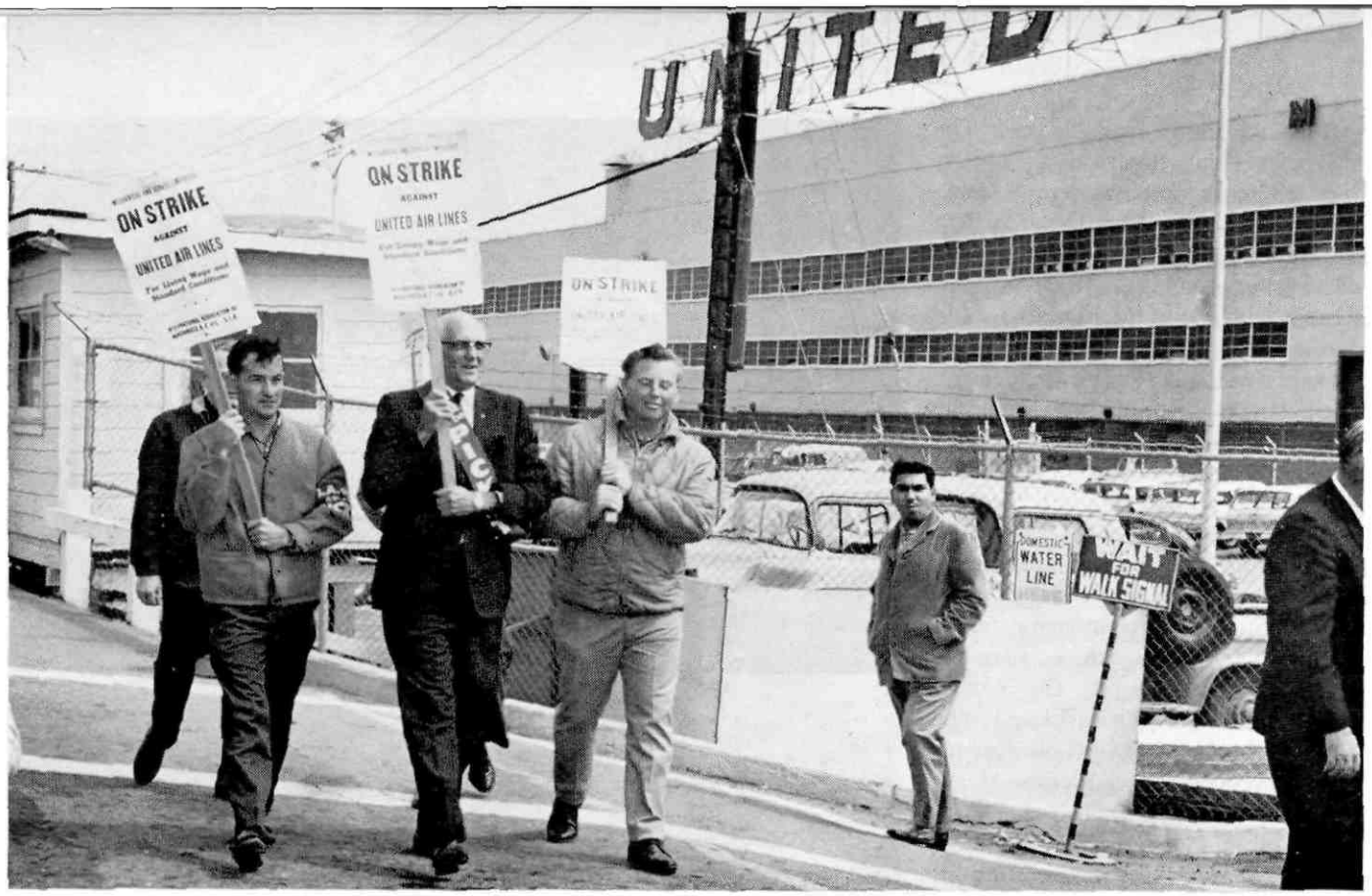
But in considering these space-age ideas for the railways, the human element must not be overlooked. The Editor of the Swiss Railwaymen's Federation newspaper, Werner Meier, writing of the 'new railway age' says this: 'Fully automatic express and super express trains, without operating or dispatching staff, will be electronically driven from A to Z by remote control. The introduction of automatic couplings is now only a matter of finance and time. The technical prerequisites for almost complete automation of the railways already exist; it is now only a question of investment. Practical experience so far shows that however expensive automation is at the present time, if by its introduction nine-tenths of the staff can be dispensed with (for instance in shunting stations, etc.), then the outlay can be written off in a few years. Today we are faced with new horizons. The much-discussed question "Automation — Friend or Foe?" becomes increasingly pertinent. It is important that we as trade unionists should come to terms with the problem immediately.'







Top: *The first electric locomotive in Switzerland was brought into service on 18 May 1891 between Sissach and Gelterkinden. Its two 25 horsepower motors enabled it to reach speeds of up to 19 km/h (Photo:* MFO). *Seventy five years of technical progress and electrification on Switzerland's railways have improved considerably on the valiant performance of that first little locomotive.* Centre: *Light express locomotive.* Bottom: *Heavier locomotive in service on the Gotthard route (*SBB *Photos).*



IAM President Roy Siemiller joins pickets during the union's recent 43-day strike against 5 US airlines.

THE AIRLINE MECHANICS' STRIKE IN AMERICA

AFTER FORTY-THREE DAYS ON STRIKE, 35,000 members of the International Association of Machinists went back to work, having ratified an agreement which their union President, Roy Siemiller, described as 'a package of benefits that is by far the best ever secured in the air transport industry and far surpasses any secured by any union, including ours, in any major industry in one set of negotiations.' Five airlines had been struck — United, Trans World, Eastern, Northwest and National — bringing to a standstill sixty per cent of America's civil airline operations.

Negotiations were formally opened with the five airlines in August 1965 — a full year before the final settlement was reached, such is the delaying power of labour legislation in industries covered by the Railway Labor Act. The contracts expired at the beginning of this year, but deadlock was reached in negotiations during January with the companies refusing to make any offer in excess of the government's guideline to check inflation which recommended that no increase should be granted in excess of 3.2% per annum. The IAM was claiming substantial pay rises, with a clause providing for a link with the consumer prices index; improved annual leave provisions and compensation for work on public holidays; and fringe benefits including health and welfare contributions to be paid in full by the employer.

Following the breakdown of negotiations the National Mediation Board intervened in the dispute, but no progress was made. Meanwhile, the union had sent out strike ballots to all its members involved, which were returned with an overwhelming vote in favour of strike action: 23 April was the date set for the stoppage.

However, at this point the government established a Presidential Emergency Board under the provisions of the Railway Labor Act to investigate the dispute and make recommendations for a settlement. This had the effect of postponing any strike action for a period of sixty days, the Board being obliged to present its recommendations within thirty days.

The Emergency Board findings proposed a $3\frac{1}{2}$-year contract providing pay increases over the period within the norm set by the government. The union immediately rejected these as furnishing no sound basis for a new contract. No improved offer was forthcoming from the airline companies, so on 8 July the strike of airline mechanics and other

ground staff organized in the IAM began. (The ITF offered international support, but this was not required.)

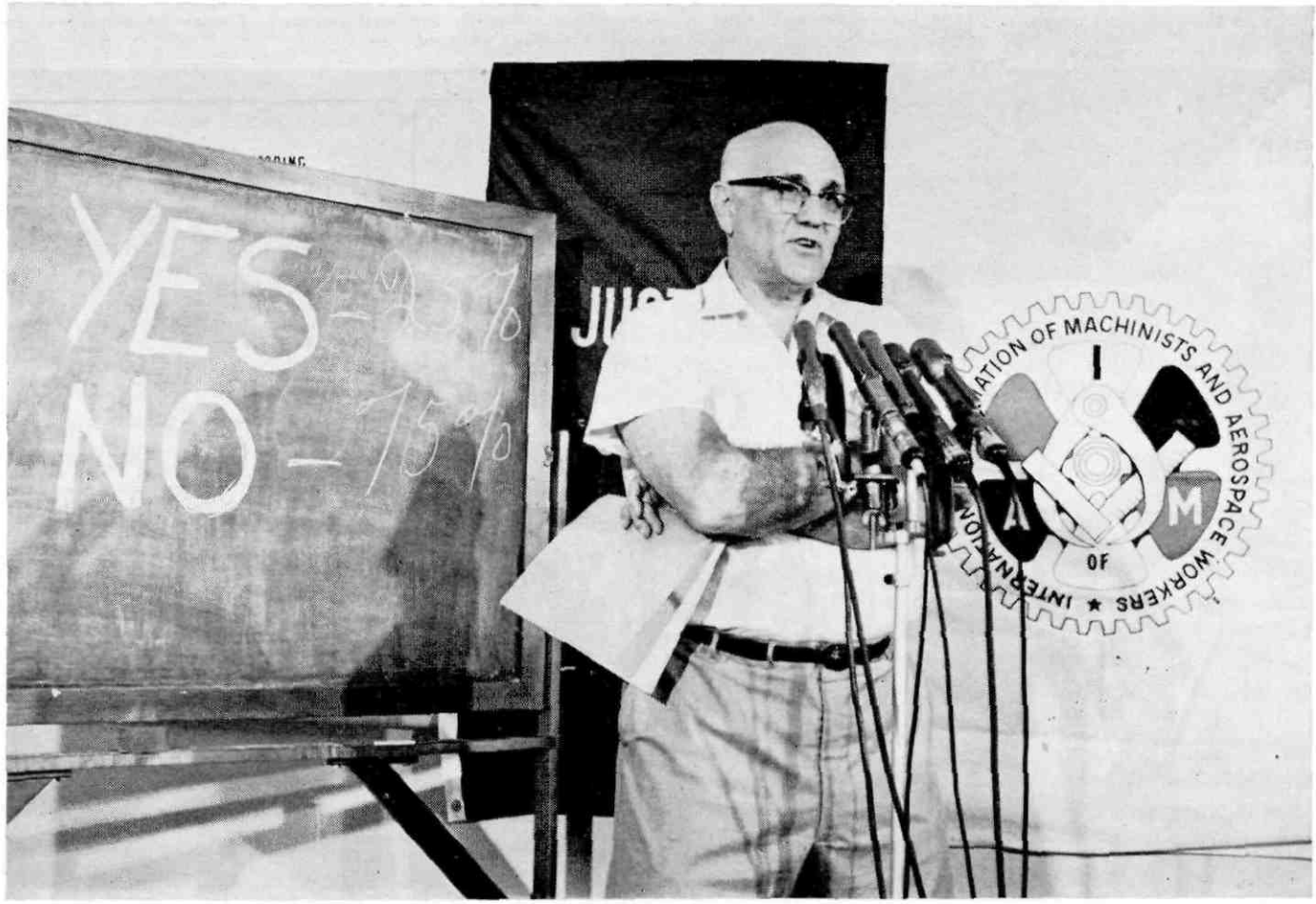
A number of attempts were made to reopen negotiations, and the Department of Labor tried to mediate. Eventually President Johnson intervened personally, and after talks with both parties at the White House he announced that a settlement had been reached. This proved premature, since the membership ballot which followed resulted in a decisive rejection of the proposed agreement by 17,251 votes to 6,587. (Even the IAM newspaper *The Machinist* was caught on the hop by this. Its issue of 4 August went to press before the result of the ballot was known, and carried the front-page headline 'Airline Settlement Won'. An apology in the following week's issue compared this gaffe with the famous occasion when the *Chicago Herald Tribune* announced the result of the November 1948 Presidential election with the headline 'Dewey Elected', when in fact, against all the predictions, Harry Truman had won!)

IAM's President, Roy Siemiller, announcing the result of the ballot, said 'The IAM is a union that not only preaches democracy, it also practises democracy.' One of the chief reasons for the rejection appeared to be the failure to include a clause linking pay rates with movements in the cost-of-living index. Another was certainly the fact that the airline companies were known to be making enormous profits, and that the rapid increases in productivity achieved by workers in the industry had largely contributed towards these profits.

However, the democratic procedures of union decision-making did not please some members of Congress, who were apparently being inundated with messages from the incensed and very vocal members of the air-travelling public to the effect that something must be done to end the strike by compulsion. Both Houses of Congress set to work to find some way of breaking the strike — without the cooperation of the administration whose spokesmen had denied early in the strike that the stoppage had brought the country to a state of emergency.

Some weeks of legislative to-ing and fro-ing resulted in the passage through both Houses of a Bill which would have sent the strikers back to work for an initial period of thirty days and given the President discretionary powers to extend this to a maximum of 180 days in the event of persistent failure by the parties to agree on a settlement. These moves to use the law to break the strike were bitterly attacked by all sections of the labour movement. AFL-CIO President George Meany stated: 'The AFL-CIO is unalterably opposed to any

Association President Siemiller announces that the agreement reached at the White House on 29 July had been rejected by a three-to-one vote of the membership. (UPI *Photo*)



legislative measure forcing free men to work against their will for the profit of private investors. . . . No national emergency faces the United States. No evidence of any delay in moving national defence material has been offered . . . any such proposal can only be considered as anti-labour in character and a retaliation against the machinists who acted as free men have every right to act.' Roy Siemiller said: 'Any legislation which prevents a work stoppage and which leaves management free from any pressure to compromise their position will end collective bargaining.'

However, before assent could be given to put this extraordinary piece of legislation on the statute books, a second tentative agreement was reached between the IAM and the airline companies. A little more caution was exercised on this occasion, proper recognition being given in the press to the sovereign power of the membership to accept or reject. The result was a solid vote in favour of acceptance: 17,727 for and 8,235 against.

Details of the new contract include the following: *Wages:* three cumulative increases of 5% payable 1 January 1966, 1 January 1967 and 1 May 1968 respectively. A formula has also been devised for adjusting wage rates to compensate for movements in the consumer prices index.

Public holidays: one additional public holiday (Good Friday) is granted immediately, and overtime worked on public holidays qualifies for pay at the rate of double time and a half.

Health and welfare benefits: companies not already doing so will contribute towards dependants' health and welfare benefits, and the employers have also given an undertaking that premiums paid by employees will not increase during the life of the agreement, which means that, should hospital and medical costs go up, the employers will be obliged to absorb the increase.

Annual leave: with effect from the start of this year, employees qualify for four weeks' leave after 15 years' service (previously 20 years) and from the beginning of 1968 those with eight years' service (currently 10 years) qualify for three weeks' leave. The period of the strike is not to be deducted from an employee's service record.

A strong sense of grievance and a determination not to be bullied won this strike for the machinists. Forty-three days is a long time to be on strike, but solidarity never faltered. They got practically everything they had originally been claiming. The fact that legislation to stop the strike nearly went into effect is, however, a disturbing reminder that anti-labour pressure groups are as powerful as ever, and it doesn't take much to plunge labour relations back into the bad old days.

Chicago Local 1487 of the International Association of Machinists pay their tributes to their President and the negotiating team that had won them the new contract. It had been a long and hard fight, but the final victory was well deserved. The airline employees got practically everything they had originally claimed.

The air line dispatcher

Flight dispatcher calculates fuel consumption.

THE AIR LINE DISPATCHER is the third pilot on the ground. He is the pilot's assistant. He is a flight planner about to be displaced by the computer. He files the pilot's flight plan with the proper government authorities. These definitions remind one of the fable where twelve blind men of Hindustan went to see an elephant. The first grasped the animal by the tail and declared it must look like a rope. The second, a tall man, felt the animal's ear and said he looks like a fan. The third felt the elephant's large legs and was certain he must look like a tree — and so on. When they reached home a vehement argument arose among them because each blind man was convinced of how the elephant looked. The moral of this story is that all the blind men were right but again they were all wrong.

Sir William P. Hildred, C.B., O.B.E., Director General of IATA, wrote the following in 1962.

'The function of the air line dispatcher, or flight operations officer, as he is called in some parts of the world, arises out of increasing complexity. He is called on to orchestrate the flow of data and decision, on which the flight depends. Operational control implies serious responsibilities and requires equally serious qualifications.'

The dispatch handbook, published by American Airlines, states among other things that an air line dispatcher '. . . must be able to get along with all kinds of people, and, particularly, with flight crews.' Every dispatcher knows this.

I have always considered the relationship between pilot and dispatcher similar to that of husband and wife. The air line dispatcher is the feminine partner of this relationship. Like a good wife, who prepares breakfast in the morning for her husband, helps him locate his clothes, reminds him of his daily duties and chores, etc., so does the air line dispatcher. He is always there, or should be, when the pilot commences his flight. He prepares his flight plan for him. He briefs him on the weather, airways, airports, loads, etc. He chats with him about the immediate problem ahead and the pilot feels well looked after. And speaking of husband-and-wife relationship, who can deny that frequently our wives have prevented us from making asses of ourselves?

Several years ago an American pilot diverted to Montreal because of New York weather. He found his way into our Air Canada flight dispatch office.

'Is this a dispatch office?' he drawled.

When assured that it was he said, 'My problems are over.'

And so they were. While we were discussing his future plans with his air line dispatcher, in New York, this man sold his flight engineer an automobile. I witnessed the contract and later they

all left for a downtown hotel and a much needed rest.

All pilots like to debrief. If they have had any unusual problems their debriefing is a lengthy one. They get it off their chests, complete the necessary forms and depart in a good state of mind. Nothing beats personal contact. Theoretically, one dispatch office on the north pole with adequate communications should do the job. But as long as human nature is what it is, centralization of control will only work on paper. No air line can afford to grow so big or so centralized that pilot-dispatcher relationship suffers.

Most of the dispatchers have a minimum of junior matriculation or its equivalent in formal education. All of them have the necessary intelligence to have acquired a college degree had they had the opportunity to do so. A survey made of the educational level of the air line dispatcher in North America, in 1961, indicate the following:

Completed high school ...	96.28%
Some education beyond high school	60.75%
College degree	18.39%
Other education	29.13%

There are undoubtedly many views concerning the desirable characteristics which an air line dispatcher should possess. In 1939, Jerome Lederer, Director of the Flight Safety Foundation, lectured at Norwick University on the subject ' Safety in Operation of Air Transportation.' In that lecture he spoke at some length concerning the air line dispatcher, his make-up and his job. Regarding the characteristics which a dispatcher should possess, Mr. Lederer had this to say:

'The dispatcher's psychological make-up is of no small importance. He must remain calm, think clearly, and act without hesitation in the midst of confusion, and when he is under stress. He should be able to impress others with his reliability and thoroughness. He should be able to profit by his experience, yet not brood over his mistakes. He should make up his mind and not change it — unless he finds that he is wrong, and then he must be able to change all of his carefully laid plans without a moment's hesitation.

' The dispatcher must never be content to let things work themselves out. Rather, he must take an active part in every problem that arises. Only in this way can he catch possible serious situations before they develop dangerously. Errors of omission are just as dangerous as errors of commission.

' In general, the dispatcher is a confirmed pessimist. He must plan well ahead, under the assumption that nothing will work out as he has planned it. Sometimes his plans work out and he has a pleasant surprise. On the whole, though, he expects things to go wrong. He is pessimistic about the weather, about the condition of his aeroplanes, about the ability of the pilots, and about the airway aids. He checks everything personally that he can. He expects continuous criticism from the pilots, from the reservation people, from the passenger agents, from the maintenance men, even from the stewardesses — and no praise at all. He tries to satisfy several agencies, whose desires are bound to conflict. The passenger agent never wants to delay a plane to await connections — unless there happen to be some connecting passengers. The Post Office clerk wants to hold for every connection — he doesn't have to placate irate passengers who are chafing because of long delays. In fact, it's almost a private motto of the air line dispatcher that "The dispatcher's always wrong." '

Although the aviation industry has changed greatly since these words were written some twenty-odd years ago, in some respects, they are still appropriate.

The air line dispatcher may be many things to many persons, depending on the vantage point. This does not matter. Air line dispatching is a profession. In this capacity the air line dispatcher is commissioned to run the air line hour to hour and day to day according to the policies laid down by his company. The dispatcher is not a myth-maker. He seeks the truth. He perceives the unwelcome facts as well as those which suit his suppositions. The dispatcher knows that the result may not turn out to his personal liking, but he hears Socrates saying: ' Either we shall find what we are seeking, or at least we shall free ourselves of the persuasion that we know what we do not know.'

Flight Dispatch and Air Safety

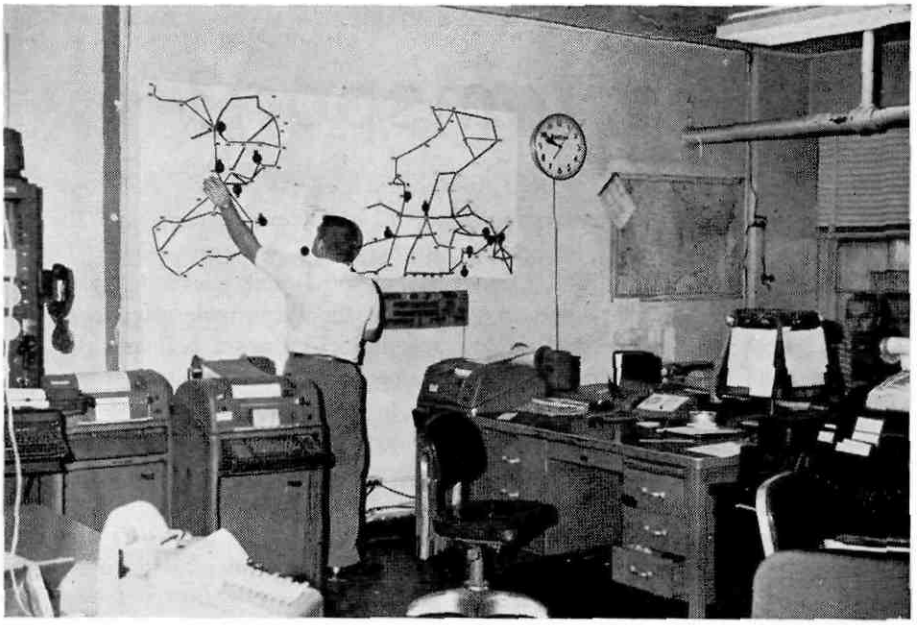
Safety is not simply a virtue of air transport — it is an essential part of the system. Yet accidents still happen and the cry goes up: is enough being done to protect the passenger from human and mechanical failure? Although mechanical failure beyond the safety point has been virtually eliminated, human failure has not been conquered.

The conduct of a flight — which is obviously more than just flying the aeroplane — is entrusted to the airline captain. Are he and his crew always provided with the best advice and information possible? Is the work-load in the cockpit not capable of being relieved by work which could be entrusted to someone on the ground? Often the answer is 'no' to the first and 'yes' to the second question.

The principle of flight despatch — a mandatory system in the USA — is that no flight may be initiated or continued unless both the captain and the dispatcher agree that it is safe to do so. The dispatcher plans the conduct of the flight, and he does so in conformity with three principles: safety, regularity and economy — in that order.

The plan is tested for compatibility with those principles, and altered or revised to conform with them. Moreover, any inflight deviation from the agreed plan must be referred back to the dispatcher for agreement, except where circumstances do not permit prior consultation.

Dispatch can best be described as an airline operations management's tactical arm, combining the functions of flight planning, monitoring the conduct of flights and coordinating remedial measures in case of irregularities. Under normal circumstances, no more



Flight dispatcher checks and records an aircraft position.

than routine position reporting at predetermined intervals is required from the flight crew. But, in the event of *en route* trouble, the information and advice provided by dispatch can materially assist the pilot in deciding the course of action he will follow — and this, in American practice, he will have to agree with the dispatcher. It is often said that flight safety is the prerogative solely of the airline captain. But to be forewarned is to be forearmed; if trouble is anticipated, an intelligent appraisal of the situation can be made by captain and dispatcher and a plan of action agreed upon. The captain is not left to work out all the details when actually faced with the problem, and when he may already be fully occupied in carrying out his primary task — that of flying the aeroplane. Only in a few countries is operational control by means of a dispatch system mandatory. More commonly, the decision to initiate, continue and terminate a flight is made by the captain; it is part of his command function.

Present-day practices in operational control have not kept pace with the evolution in communication and management techniques. It is not the means that are lacking, but the inability or unwillingness to distinguish between a 'strategic' (operations control) function and a tactical (flight-management) function. The two are inevitably linked together, and depend for their effectiveness on a two-way flow of information. The 'tactical' role of dispatch in relation to operations management is complementary to its 'strategical' role in relation to the flight.

Practicability of the concept depends on two further conditions: personnel qualification and application to small airline operation. Dispatcher qualification is amply defined in ICAO and American FAA documentation. It calls for ability to make decisions in difficult circumstances and avoidance of premature commitment to irrevocable action. Aircrew experience is a useful, though not an indispensable, attribute. Clearly, personnel of this calibre are not easily found, and their competence is as much a product of experience as it is of training.

For the smaller airline, engaged principally in short-haul or irregular operations, an individual dispatch organization is neither a practical nor an economical proposition. Yet it is no less essential for flight safety and for regularity of operation. The latter requirement can be met by regional cooperation between airlines in establishing joint dispatch offices at suitable locations, or by an independent organization operating such a facility as a service to operators.

Short-haul operations, in particular, pose problems associated with multiple flight sectors, adverse weather conditions, and the need to match the speed advantage with the reliability offered by competitive surface transport. The functions of a dispatch centre would be:

(1) Liaison with operators' traffic offices and stations. (2) Preparation of sector flight plans and transmission to departure points. (3) Collection and dissemination of all significant operational information. (4) Liaison with flights *en route* for purposes of operational control. (5) Liaison with ATC. (6) Provision of flight information to airline operators. (7) Liaison and coordination with other airline operational control centres. (8) Resolution of operational irregularities.

The degree of responsibility and authority delegated to the operations centre by each participating airline will vary according to circumstances and type of operation, but sufficient operational autonomy must be allowed to enable the decision-making activity to proceed efficiently and effectively. To entrust this task to a State authority is not desirable if the operational freedom of the different enterprises is to be maintained; nor is it likely to aid airline efficiency. Operational control and ATC are complementary functions; to merge them under one authority would not serve the purposes of either.

Air safety must remain primarily an airline responsibility, though this by no means diminishes a State's responsibilities for coordinating performance standards and providing the facilities for safe operation. One method airlines can use in pursuit of this objective has been described here. Is it too much to hope that, before long, it will find application?

from The International Flight Dispatcher

What's new in transport?

100-mph trains planned for NY commuters

BEFORE 1970, commuting New Yorkers may be able to travel to and from their jobs each day in trains capable of speeds of up to 100 miles per hour. The New York State Metropolitan Transportation Commuter Authority has recently published plans for introducing 500 self-propelled, high-speed rail cars on the Long Island Railroad, one of the city's principal commuter lines. It indicated that the new trains could be in service within 18 months.

The new railcars will be able to run on the existing tracks and, like underground trains, will have doors that operate automatically to facilitate quick loading and unloading of passengers. The cars will be electrically powered, will have a considerably higher acceleration rate than existing trains, and will each have their own power units. The highest speeds possible with the line's existing rolling stock range from 60 to 70 mph., and about seventy per cent of the existing rolling stock of over a thousand cars and more than 30 years old.

The Long Island plans follow the disclosure by the New York Central Railroad, a large north-eastern system, that it was experimenting with high-speed trains for introduction on some of its routes. Earlier the US Federal Government launched a multi-million dollar scheme, in co-operation with another large network, the Pennsylvania Railroad, to examine the feasibility of operating 100-mph trains along the highly populated north-eastern 'corridor' extending from Boston through New York to Washington.

* * * *

Rail profits soar in US

THE ASSOCIATION OF American Railroads has reported that the net profits of Class I railroads have risen by 28.6 per cent during the first six months of 1966 over the same period of last year. In addition, a Wall Street brokerage firm has produced a report which says that America's railroads are now in a 'revolutionary' phase which 'should transform the 140-year-old railroad industry from one generally thought of as stagnant or slowly dying to one possessing unusually dynamic characteristics'. In terms of profits, 'no other established US industry has such an explosive growth potential.'

The report predicts that net profits will nearly double by 1970; this allows for wage increases to those employed in the industry during the period between 1965 and 1970 totalling $350m. a year. However, the report says that by 1970 higher wages will be offset by savings of $348m. per year achieved by reducing what it calls 'featherbedding'.

Productivity has increased according to the report. There has been 'a marked increase in operating efficiency accompanied by a decline in employment at an average rate of about four per cent per year.' The year 1965 was particularly marked in this respect, the number of railroad jobs dropping by over 15,000 in the face of a 5.6 per cent increase in physical volume of traffic. The unions point out that the productivity of the railroad worker has increased at a far faster rate than his wages. Current pay and conditions it claims are aimed at making good this disparity.

The report also predicts further substantial changes in the pattern of railroad operations as a result of technological innovations.

* * * *

Television supervision of level crossings

IN ORDER TO AVOID the frequent accidents which occur at level crossings, the French Railways (SNCF) have for some time been experimenting in Nantes with a system of supervision by means of a television camera on the line from Nantes to Pornic. Derived from the closed-circuit television system in use on the Paris underground, in this the motorist rings a bell and the gate is opened by a crossing keeper who can see both the railway line and the road on a television screen. However, this system is not suitable for open-air use.

If the equipment used at Nantes proves satisfactory, the SNCF plans to extend the experiment. Priority will be given to level crossings which at the moment are controlled by a telephonic system. This has the disadvantage that it operates 'blind.' The motorist asks for the gate to be opened by telephone link with the nearest railway station.

* * * *

New 'sea truck' demonstrated

THE FIRST PRODUCTION MODEL of a new vehicle for carrying big or bulky cargoes swiftly and cheaply over water at comparatively high speed has been demonstrated recently at Teignmouth, England. Known as the 'Sea Truck,' the craft has been designed as the marine equivalent of a lorry. It works on an air cushion principle, not unlike the hovercraft—except that it cannot travel over land — yet is simple and rugged in construction and cheap to operate.

Further characteristics are an exceptionally soft and stable 'ride,' even in quite rough water, and the ability to drive the craft straight into a beach or slipway for walk-on or drive-on loading. The craft has a flat load-carrying area of 170 sq. ft. and is designed to carry a 1-ton load for seven miles at 20 knots in less than 2 feet of water on one gallon of petrol.

Whilst the prototype was constructed of marine timbers throughout, the Sea Truck is basically a one-piece, moulded glassfibre hull for durability and rot-resistance, strength, low maintenance, low weight and volume production. For strength and rigidity the hull is con-

structed in rectangular box sections filled with foamed polystyrene.

* * * *

Ticket machine can detect forgeries

AN AUTOMATIC TICKET-ISSUING machine has been developed in Sweden which will be introduced first on one-man buses in Malmö. Payment can be made either by tokens or coins and the machine issues up to three different kinds of tickets and is equipped with a device for clipping them. Apart from the value, consecutive numbers and the company's imprint, the ticket has space for up to 12 figures or letters giving details of time, date, line, fare-stage, etc. The mechanism, which has to be reversed on reaching the terminus, can be operated from the driver's seat.

The passenger inserts a token into the machine, and a ticket is immediately issued, unless he has attempted to cheat the machine. No ticket is forthcoming if a false token or coin is inserted. This not only acts as a safeguard against forgery, but is also important when the fares change. Once the machine has been adjusted it will reject the old tokens.

The machine is also equipped with a 'buy-back' device. If the driver's supply of tokens runs out, he can extract tokens from the machine by inserting a 1-kr. piece.

All coins and tokens which go into the machine are inaccessible to both driver and passengers, since they fall through into a strongbox. When the driver finishes his shift he takes out this box and deposits it at the office, where money and tokens are sorted and checked. The new driver has his own box and the machine will not work until this has been properly installed.

Bus operators in Germany and Switzerland have expressed a great interest in the possibility of acquiring this machine.

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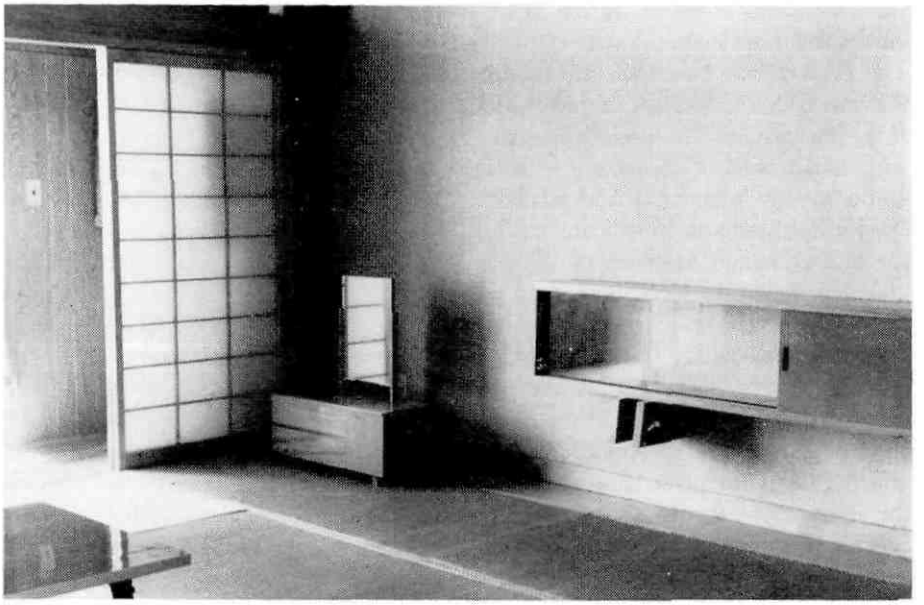

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Seamen's hostel for Okinawa

The All-Japan Seamen's Union has sent us pictures of the seamen's hostel recently established in Okinawa, some of which we reproduce here. 1. Exterior of the hostel. 2. One of the Japanese-style bedrooms on the third floor — this one can accommodate eight people. 3. A corner of one of the Western-style bedrooms on the second and third floors — this can also accommodate eight. 4. The meeting hall on the first floor.

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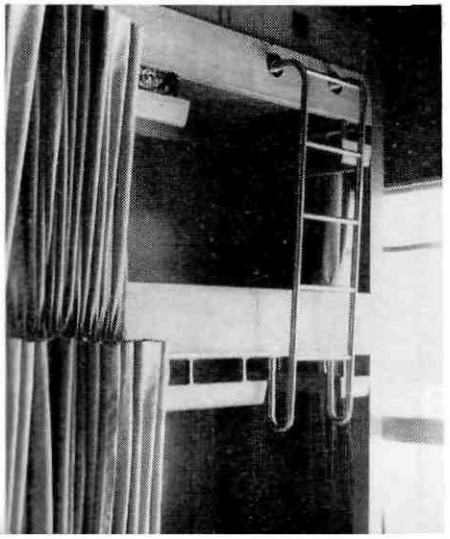

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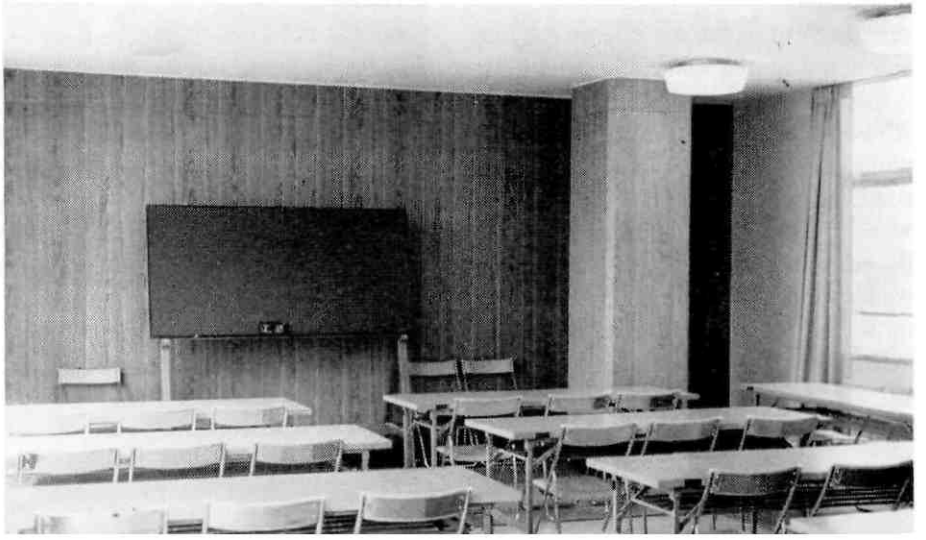

THIS IS ONE WATCH!

from Seafarers' Log, *newspaper of the SIU*

IN MAY THIS YEAR the Seafarers' International Union and other US maritime unions met with the United States Coast Guard in Washington to register their collective opposition to any arbitrary reduction of manning scales on Great Lakes ships. The Unions vigorously insisted upon adequate manning requirements to ensure maximum shipboard safety. The union meeting with the Coast Guard stemmed from attempts by the latter to make unilaterally drastic reductions in the engine room manning scale.

The protest was based on the case of the mv *Diamond Alkali*, a retro-fitted ship, for which the Coast Guard — without advising or consulting with the union in any manner — had issued a temporary manning certificate calling for one Qualified Member of the Engine department to serve in place of the three oilers on watch and the two wipers on day work.

In presenting its viewpoint, the SIU submitted a detailed study of the duties of the engine room personnel involved and the demands placed upon them in the interests of the ship's safety. The SIU's statement included a pictorial summary accompanied by a detailed description of the oiler's many duties while on watch.

The mv *Diamond Alkali* was built in 1917 and was a coal-burning vessel until repowered in 1964. In that year she was refitted with a diesel engine of 4,300 h.p. The *Diamond Alkali* has two boilers of 105 pound steam pressure, both of which are operated by an automatic burner control system.

Since the retrofitting the *Diamond Alkali* sailed with a complement of five unlicensed personnel (three watch-standing oilers and two wipers on day work). However, the Coast Guard issued a temporary manning certificate which would have eliminated the oilers on watch. The Coast Guard's arbitrary action was taken despite the fact that the oilers continue to perform the same duties and functions they have performed since retrofitting. In fact, the oilers have more work to do now than they had to do before the ship was changed over to diesel propulsion.

Such a drastic and sweeping change in the manning schedule for engine room personnel is, of course, a matter of concern to all seafarers. The safe navigation of the mv *Diamond Alkali* is not possible with only one man on watch in the engine room. Moreover, the engineer cannot properly perform all the duties required of him without the existing unlicensed personnel.

As a result of the strong joint stand taken by all the maritime unions, the Coast Guard announced that it would review its decision. The photographs accompanying this article came from the SIU document presented to the Coast Guard and represent some of the duties performed by the oiler on watch.

1. Greasing pump pulleys; checked every 20 minutes; greased manually to prevent burnout and possible fire danger.
2. Greasing bilge pump; checked every 20 minutes, greased manually as needed.
3. Checking sump tank oil level; checked every 20 minutes; oil added manually; tank contains lubricant pumped to main engine governor.

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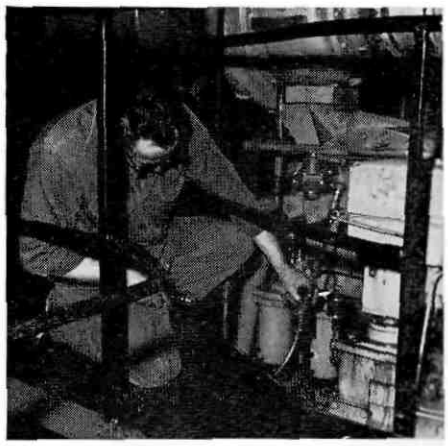

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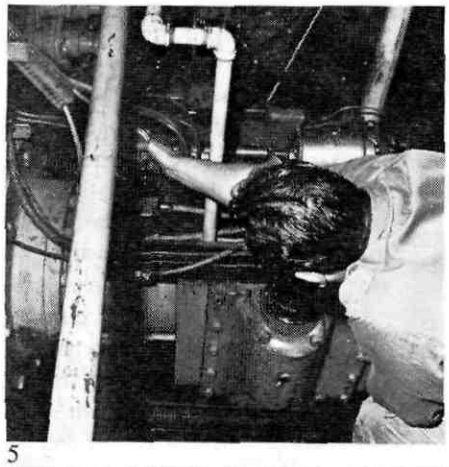

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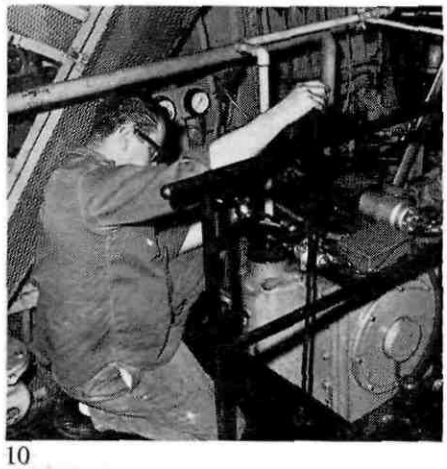

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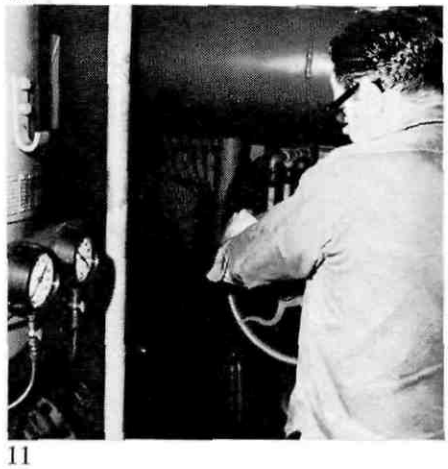

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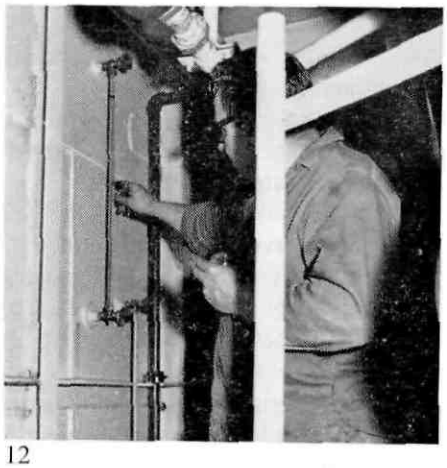
4. Greasing steering engine; twelve fittings greased manually and linkage oiled each watch; cleanup of oil spillage or leaks very important for safety.
5. Oiling linkage Kemewa; oil checked every hour and added as needed; contains many moving parts in addition to linkage; controls propeller pitching.
6. Filling out routine hourly log; oiler required to fill in information every hour for use of engineer on watch; pressures, temperatures, etc., collected during oiler's regular rounds from meters and gauges all over engine room.
7. Engineer's station — engineer room; Nordberg diesel engineer checks out Nordberg equipment; Nordberg engineers are on call and often aboard ship.
8. Changing main engine duplex oil strainer; done each watch; removal, cleaning and replacement takes 15 minutes; done more often when main engine filters are changed; clogged strainer could lead to increased pressure and damage to main engine.
9. Checking hourly log; oiler must record 56 oil and temperature readings hourly.
10. Checking sump pump oil level; checked manually every 20 minutes with dip stick; oiler must add oil by hand as needed; this oil lubricates pump which controls propeller pitching.
11. Opening main discharge valve on ballast pump; time-consuming chore for oiler each time ship discharges cargo; operated manually to keep vessel straight while discharging cargo.
12. Checking water level in afterpeak; done manually each time ship leaves port; sometimes several times in 24-hour period; oiler must go to lower engine room to start pumps.
13. Adding mud removed before filling ballast tanks; empty ballast tanks must be injected with mud remover before filling to prevent



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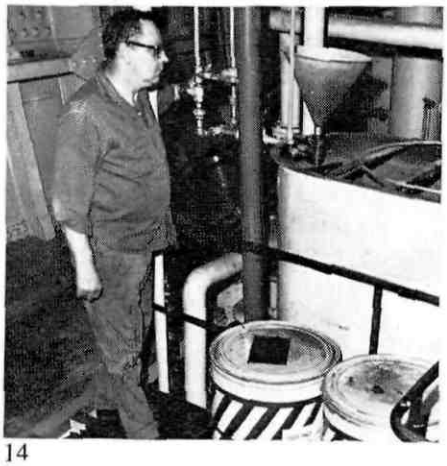

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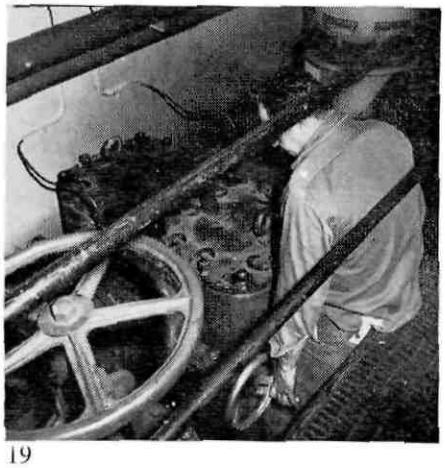

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sludge and mud buildup which could make ship run with dangerous list.

14. Mixing Zemmite mud remover; must be done manually by oiler each time ballast tanks are filled to assure safe control of ship when under way.
15. Changing bilge strainers; done manually at least once each watch. Gear is located in lower engine room.
16. Opening suction on deck wash and fire pump. Performed whenever ship is washing down and during fire and boat drill; may be done several times in 24-hour period, at any time of day or night; very necessary for safe operation of ship; this complicated job involves isolating direct line from fire pump, opening manual valves to steam de-icer and steam regulator on deck, maintaining even temperature and manning sanitary pump.
17. Checking water level in expansion jacket water tank; checked every 20 minutes and topped off manually at end of each watch; breakdown would cause overheating of main engine.
18. Checking reduction gears sump level; oil checked every 20 minutes and added manually as needed; must be checked visually because there is no gauge in console room; reduction gears transmit power from main engine shaft to propeller shaft.
19. Changing strainer on main suction pumps; pumps provide raw water for cooling entire plant, which must be strained before entering system; strainer is changed at least once each watch; but when sailing in dirty rivers or harbours, close to bottom or in ice, five men, including two engineers and all three oilers may be kept busy keeping strainers clear of sludge, fresh ice, pulp and other foreign matter. Clogged strainers could cause shutdown of entire plant — especially dangerous when ship is moving up river.

International Transport Workers' Federation

General Secretary: HANS IMHOF

President: HANS DÜBY

7 *industrial sections catering for*

RAILWAYMEN
ROAD TRANSPORT WORKERS
INLAND WATERWAY WORKERS
PORT WORKERS
SEAFARERS
FISHERMEN
CIVIL AVIATION STAFF

- Founded in London in 1896
- Reconstituted at Amsterdam in 1919
- Headquarters in London since the outbreak of the Second World War
- 339 affiliated organizations in 84 countries
- Total membership: 6,500,000

The aims of the ITF are

to support the national and international action of workers in the struggle against economic exploitation and political oppression and to make international trade union solidarity effective;

to cooperate in the establishment of a world order based on the association of all peoples in freedom and equality for the promotion of their welfare by the common use of the world's resources;

to seek universal recognition and enforcement of the right to organize in trade unions;

to defend and promote, internationally, the economic, social and occupational interests of all transport workers;

to represent transport workers in international agencies performing functions which affect their social, economic and occupational conditions;

to furnish its affiliated organizations with information about the wages and working conditions of transport workers in different parts of the world, legislation affecting them, the development and activities of their trade unions, and other kindred matters.

Affiliated unions in

Aden * Argentina * Australia * Austria * Barbados * Belgium Bermuda * Bolivia * Brazil * British Honduras * Burma Canada * Chile * Colombia * Congo * Costa Rica * Curaçao Cyprus * Denmark * Dominican Republic * Ecuador Estonia (Exile) * Faroe Islands * Finland * France * Gambia Germany * Great Britain * Greece * Grenada * Guatemala Guyana * Honduras * Hong Kong * Iceland * India Indonesia * Israel * Italy * Jamaica * Japan * Jordan * Kenya Lebanon * Liberia * Libya * Luxembourg * Madagascar Malawi * Malaya * Malta * Mauritius * Mexico * The Netherlands * New Zealand * Nicaragua * Nigeria * Norway Pakistan * Panama * Paraguay * Peru * Philippines * Poland (Exile) * Republic of Ireland * Republic of Korea * Rhodesia St. Lucia * Senegal * Sierra Leone * South Africa * South Vietnam * Spain (Illegal Underground Movement) * Sweden Switzerland * Taiwan * Trinidad * Tunisia * Turkey * Uganda United Arab Republic * United States of America * Uruguay Venezuela * Zambia

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