RULES AND INSTRUCTIONS FOR LIGHTKEEPERS AND FOG ALARM ENGINEERS AND RULES GOVERNING BUOYS AND BEACONS

ISSUED BY

MARINE SERVICES - DEPARTMENT OF TRANSPORT

CANADA

RULES AND INSTRUCTIONS

FOR

LIGHTKEEPERS AND FOG ALARM ENGINEERS

AND

RULES GOVERNING BUOYS AND BEACONS

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BY AUTHORITY OF THE DEPARTMENT OF TRANSPORT

OTTAWA, CANADA

1953

NOTE

These Rules and Instructions are issued by the Department of Transport to be observed by all Lightkeepers and Fog Alarm Engineers in the skillful and faithful performance of their important duties upon which greatly depends the security of life and property engaged in navigation.

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PART I

RULES AND INSTRUCTIONS FOR LIGHTKEEPERS

EXHIBITION OF LIGHTS

1. In areas where there is no closed season for gereral navigation, lights are to be exhibited all the year round. Seasonal lights will be placed in operation at the opening of navigation and will be maintained in operation while navigation remains open. Lights used solely as harbour lights need not be exhibited when the harbour is closed though the general navigation remain open. Fishing lights need be exhibited only during the fishing season.

2. Whenever there is any possibility that navigation in the vicinity is open, the lights are to be exhibited. In any case where a keeper has the slightest doubt whether the light is required, it is to be kept in operation.

3. Any Lightkeeper in doubt concerning his duty under the above regulations governing exhibition of lights is to apply to the District Marine Agent for special instructions.

4. The dates and duration of any periods during which the light or lights were not exhibited are to be recorded in the first subsequent quarterly report forwarded. In the case of seasonal lights, this will include the date the light is placed in operation in the spring and the date of discontinuance in the fall.

5. Lights are to be lighted at sunset and kept burning at their full brilliancy until sunrise except when the weather is foggy or dark from any other cause, in which case the Lightkeeper will light them earlier or keep them lighted later, as may be necessary for the security of navigation.

6. No circumstance whatever will excuse any keeper for failure to properly exhibit the light or lights in his charge at the prescribed time or for neglecting to keep them burning with the greatest possible brilliancy.

LIGHT ATTENDANCE

7. The keeper is to be in attendance sufficiently early to have lights burning with their full effect by the time twilight ends. When lamps are first lighted the wicks are to be low, and afterwards they are to be raised very gradually until the full power of the flame is attained.

8. After lighting up, the keeper is to remain in the lantern for thirty minutes, attending to the flame of the lamps and, before leaving, he is to be particular in seeing that all the reflectors, lamps, chimneys, etc., are vertically and truly in position, the lamps burning clearly at their full height, and the glass chimneys all clean and whole. A supply of spare chimneys must always be kept clean, ready to replace any that may get smoked or broken.

9. At minor lightstations using kerosene oil lamps with wicks, the keeper is not expected to remain in attendance or visit during the night except when unusual conditions prevail, such as heavy gales or derangement of the apparatus. At all stations employing vapour lights, occulting, revolving, or flashing apparatus, the keeper is expected to visit the light at stated intervals throughout the night, the visits to be of such frequency as will ensure an efficient light being maintained.

10. At stations having a lightkeeper and one or more assistants, the one on duty shall call his relief a few minutes before the expiration of his watch, and return immediately and remain on duty until the arrival of his relief, when he shall turn over the lights to the relief and inform him of everything that may be necessary with regard to the condition of the lights and ventilation, and the effect of the weather on the flames.

11. The keeper is to bear in mind that, unless the full power and development of the flame of the lamps are obtained, the value of the remainder of the apparatus is in a large measure lost, and that, to obtain the best results, attention to the principles which regulate the production of the flame, and unceasing watchfulness during the time of its exhibition, are necessary.

12. The principal features, therefore, to be observed are: (1) that a free current of air is necessary to perfect conbustion; (2) that the substance to be consumed is not the wick but the oil; (3) that the oil should be pure and free from sediment so that the wick may supply it abundantly to the flame.

13. Particular attention must be paid to ventilation of the lantern. This can be regulated by the trap door, the air registers in the floor and the base pieces, and the revolving plate in the ventilator overhead. At concrete towers and high wooden towers, a door or window is to be left open in fine weather to permit passage of a current of air up the tower.

14. The invariable cause of low flame is a charred wick. If, during the night, the wicks become charred, they must be trimmed, special care being taken to have their tops exactly even and free from smoky points.

15. Whenever a flame shows signs of diminution or dullness, the wick must be trimmed, the chimney cleaned or changed, or the draft regulated, as the case may require; but every lamp must be kept burning at its full power from the time of lighting until it is put out.

CARE AND MAINTENANCE OF LIGHTS AND APPARATUS

16. Lamps and apparatus are to be cleaned daily as hereinafter described.

17. As soon as the lights are put out, the wicks are to be trimmed, as it can then be much better done than when they are cold.

18. The oil reservoirs are to be filled and generally all work necessary to prepare the lamps for lighting in the evening properly performed.

19. All parts of burners exposed to the action of the flame are to be kept bright and polished, other parts to be kept perfectly clean, especially the ventilating holes in the burners.

20. Lenses are to be cleaned and polished, great care being exercised that the glass does not become scratched.

21. The glass of the lantern is to be polished both inside and out with cloths provided for the purpose.

22. The floor and interior of the lantern is to be thoroughly cleaned, care being taken not to raise any dust.

23. The blinds are then to be put upon the lantern windows and the linen covers provided for the purpose put over the lenses or reflectors. In the case of a revolving light, the clockwork is to be wound up, and the weight supported so that there may be no strain upon the cord.

24. All implements and cloths used in cleaning are to be removed from the lantern to their proper places in the lightroom when daily cleaning is completed. No tools, cloths, nor oil vessels are, under any circumstances, to be kept in the lantern.

25. Particular attention must be given to the cleaning of reflectors. The silvered surface of the copper reflectors and the highly polished surface of the aluminum variety is exceedingly susceptible to scratching and marking. They should never be cleaned with an abrasive of any kind nor ''dusted'' with a dry cloth but must be carefully removed and immersed in hot soapy water or in hot water containing the detergent supplied by the Department. Whilst immersed in the solution, they should be gently washed with the hands or a soft cloth such as cheese-cloth, flannelette, etc., and finally dried with a circular motion using a clean, dry, soft cloth. Any scratches in the silvering must be due to dust or careless work and the keeper will be held accountable for them. Care should be taken to avoid finger marks on the polished surface of reflectors as they are difficult to remove.

26. If daily and careful washing is provided, reflectors will not tarnish or become discoloured for long periods.

27. The backs or copper parts of the reflectors, as well as the stands or frames on which they are placed, are to be kept thoroughly clean. In replacing reflectors on their stands, care must be taken that they are fixed as originally set, with their fronts leaning a little downward rather than upward.

28. The glass prisms and lenses of a dioptric apparatus are to be cleaned every day when in use, being first freed from dust by using a slightly damp cloth, and then rubbed perfectly clean and dry with a soft cheese-cloth.

29. If the glass becomes greasy, it should first be washed with a clean cloth steeped in methylated spirits then carefully dried with a soft cloth free from all dust or grit, and finally rubbed with a fine flannelette or cheese-cloth.

30. The level of the lenses must be tested periodically. It is fatal to the efficiency of the light if the lens is out of plumb or the lamp out of focus.

31. All polished metal work about the light apparatus is to be kept clean and in good order, but, while being cleaned, great care is to be taken that the glass prisms and lenses receive no injury. There is no occasion to use any polishing material on the metal framing of lenses; all that is required is to keep the metal free from deposits of foreign matter.

32. The lantern glass is to be kept clean and clear from drift, snow, sleet, or any other obstruction to the light on the outside, and also from any moisture that may accumulate on the inside.

33. In addition to such cleaning of the plate glass of the lantern as the weather may necessitate, once a week it is to be thoroughly cleaned inside and out with soap and water. The glass is then to be polished until clean and clear.

34. The storm panes furnished for replacing broken glass in the lantern must always be kept ready for use, and, when required, put in place without any unnecessary delay.

35. Besides the daily cleaning of the lantern, all parts are to be carefully examined, and any requisite repairs made at once. Particular care is to be taken to keep the joints tight, and to see that all the putty around the glass is secure.

36. The whole painted interior of every lighthouse lantern, including false roof, ventilator, smoke con-

ductors, etc., is to be kept clean and free from soot and grease by occasional scrubbing with clean soft hot water and soap followed by clean water.

37. Lamp reservoirs or fonts are to be emptied and thoroughly cleaned with hot water and soap at least once in two months, and more often if needed.

38. For directions with respect to the care and operation of vapour lights, reference should be made to the instruction card in the lantern room. Any additional instructions required will be given by the inspecting officer of the Department. At least annually, the keeper of a vapour light is to empty the pressure oil tank and wash it out with warm soapy water taking care that the tank is thoroughly dry before refilling. When filling the tank, oil is to be filtered through felt provided by the Department for the purpose.

39. Machinery must be regulated so as to have a uniform motion, and must have its revolutions frequently checked, and, if not performing according to the advertised characteristic, necessary adjustments should be made.

40. At stations where the apparatus is carried on a float revolving in a bath of mercury, the bath must be emptied once a year, the mercury being drawn off into the original flasks. When emptied, the bath must be carefully cleaned and likewise the float. In re-assembling, the greatest care must be exercised to the end that the bath may be raised to its proper position and that sufficient mercury and no more is placed in the bath.

41. Care must be exercised at all times that any deficiency of mercury, whether occasioned by evaporation, leakage or splashing due to vibration of the tower is made good immediately.

The keeper will note that the weight of the revolving part of the apparatus, in the case of mercury floats, is to be supported by the mercury and not by the ball bearings. The bearings are intended only as guides to keep the apparatus truly vertical.

42. All tools and materials required in the service of the lantern and apparatus are to be stowed away in

the lightroom, which is to be fitted up with convenient shelves and drawers or cupboards, bench, and, in the case of catoptric lights, with a reflector-polishing stand.

REPAIRS

43. Keepers must perform, as part of their regular duties, any repairs which can be made without the assistance of skilled labour, and which may be necessary to the efficiency of their stations.

44. Should any unexpected repairs be required to meet an emergency, the keeper shall report them at once to the District Marine Agent, adding an estimate of the cost.

45. No expenditure for repairs or other purpose must be incurred by a keeper without specific written authority from a responsible officer of the Department of Transport and no expenditure authorized must be exceeded without further written authority. Except in a case of extreme urgency, no claim for reimbursement of unauthorized expenditure will be entertained.

46. Where any authorized repairs or other work necessitating the employment of additional labour are carried out in the absence of the superintendent, the Lightkeeper is to keep account of the men's time and any materials used, and will render a full statement of same to the District Marine Agent.

47. Accounts are to be submitted to the District Marine Agent. Those containing items for materials must give quantities and rates charged. Accounts for labour must give the time the labourers were actually engaged and rate per day. Keepers must certify each account as nearly in the following words as may be applicable: ''I certify that the above expenditure was authorized and was actually incurred on Government business, that the materials were provided (and/or) that the labour was actually performed, and that the prices charged are fair and just.'' This certificate is to be signed and dated by the keeper, with the name of his station and post office given, and he will be held legally responsible for the correctness of his certificate.

48. Lightkeepers must protect the Government by having any authorized expenditure confined within the lowest possible limits. They will be held responsible for any neglect in this respect as well as for any disposition shown to impose unnecessary expense upon the Government either personally or in purchases made or labour employed.

PAINTING

49. Keepers must do all painting and whitewashing required of towers, dwellings and outbuildings at their stations, as part of their regular duties, but, where a tower is so high that scaffolding is required, unskilled assistance may be allowed. Special authority for obtaining such assistance must first be secured from the District Marine Agent.

At stations where a keeper and one or more assistants are employed, they must do all painting without outside assistance.

50. The whole interior of every lighthouse lantern above the window sills, including false roof, ventilator, smoke conductors, etc., is to be painted white, the paint to be renewed as often as necessary.

51. Once a year, at least, the lantern and its appendages are to be scraped clean from all rust and blistered paint, and newly painted inside and out.

52. In painting, durability is to be the first consideration. The surface to be painted must be smooth and free from grease or dirt. If wood is new, all knots or other places showing gum must first be covered with a coat of shellac to prevent the gum from showing through. Paint for the priming coat should be thinned out and, in applying brushed in well. After priming, all holes, cracks, nailheads, etc., must be filled with putty, and, when dry, carefully smoothed. If iron is new, a thin coat or two of red lead should be put on as a priming.

A second coat of paint is never to be put on until the previous one is thoroughly dry and hard, which will never be the case whilst the least stickiness is felt on applying the hand to it. Each coat should be of the same thickness throughout, with just sufficient paint to lie smoothly without running, otherwise the

work, when done, will have an unfinished or slovenly appearance.

CARE AND HANDLING OF STORES

53. When stores are being landed, the keepers are to attend and give their assistance. The principal keeper at each station must, upon these occasions, satisfy himself of the quantity and condition of the stores received, which must be entered in the quarterly returns. Stores, including fuel, must be placed under cover immediately after being landed.

54. Should the supply of any stores appear to be getting short, so as thereby to endanger the regular appearance of the light, the lightkeeper must inform the District Marine Agent immediately by mail, telegraph, or radiophone as the urgency of the case requires.

55. The keeper is responsible for the safety and good order of all stores, utensils, tools, and apparatus. He must ensure that everything is kept in its proper place and put to its proper use. He is also to observe the strictest economy and most careful management in the use of all stores.

56. All worn out or unserviceable articles are to be preserved by the keeper until the visit of the superintendent with the supply vessel, when they are to be handed over to him. Any deficiencies will be charged against the keeper. On no account is the keeper to throw away or otherwise dispose of anything belonging to the Department without special orders.

FIRE PRECAUTIONS

57. Lightkeepers must take every precaution against accident to, or destruction of, the station by fire.

58. In the event of fire, lightkeepers are to do everything within their power to extinguish the blaze and limit the damage without exposing themselves to unnecessary risks. They are to report promptly by telegraph, radiophone or the readiest means available to the District Marine Agent stating briefly the ex-

tent of damage and other pertinent information. At the first opportunity thereafter a detailed report is to be forwarded by mail.

59. The keeper must take special care at all times that neither matches nor anything that can be easily ignited are left anywhere about the premises, so as to endanger them by fire. Any substance saturated with oil is particularly dangerous, as it is liable to spontaneous combustion.

60. In case of fire in the lantern or lightroom, water should not be used on burning oil as this will spread the flames. Sand may be used to smother the fire around the lightroom or lantern room but if possible should be kept away from reflectors, lenses and occulting machinery. The best and most reliable method to combat the fire will be by use of the fire extinguisher which will smother the fire rapidly and without harm to the apparatus.

61. The keeper must ensure that fire extinguishers placed in the lantern or lightroom are not removed and are kept ready for use at all times. Where automatic extinguishers are installed they will explode and smother the fire when the temperature rises to a dangerous point. Should a fire occur in a lantern where these extinguishers are installed, the keeper should immediately leave the lantern if the fire appears to get out of hand, closing the door or trap door firmly behind him in order to concentrate the smothering gases within the lantern to the best advantage.

CAUTION: Although the fumes generated by the automatic type extinguisher are themselves non-toxic, they will not support life or combustion. On re-entering a room after such an extinguisher has been used, the door should be opened carefully to ensure the fire is properly out and if so, all ventilators and doors should be opened fully to exhaust the gases before entering and attempting to re-light the lamp.

62. A light is never to be taken into the oil store nor is oil under any circumstances to be heated by fire, as it then gives off gases that will explode on the slightest contact with fire.

GENERAL

63. In addition to their regular routine duties, keepers must at all times be ready to perform any duties connected with the repair of lighthouses or apparatus, maintenance of lights, preservation of stores, repairing and keeping in order dwelling houses, landing places, roads, drains, fences and everything belonging to the Department; in short, a keeper is expected to take the same care of his station and do the same work about it, as a thrifty man would do with his own property. At full-time stations, the Department considers the salary paid to be sufficient in every case to cover all the work required of the keeper in and around the station under his charge and, therefore, the Department expects to have the disposal of the whole time of the keeper, At stations where an allowance is made contingent on the employment of assistants, the Department will also expect to have the disposal of the whole time of such assistants.

64. At stations where the entire time of the keeper is not paid for by the Department, e.g., - minor lights, part-time keepers, the keeper may engage in any legitimate occupation which does not interfere with his duties as lightkeeper. In such cases, the Department does not expect to obtain the whole of the keeper's time but insists, in addition to attendance on the lights, that he must do all work and painting necessary to keep the Government property in good condition and order.

65. Lightkeepers are not on any account to absent themselves from their duties without leave from the Department except for such short periods as may reasonably be required for the purpose of drawing salary, procuring provisions or attending church, but in every case an efficient substitute must be provided during absence. At stations where an assistant is employed, the keeper and the assistant shall not, together, leave the station, but one shall remain at all times except for such occasions as assisting in launching or docking the station's boat or in landing supplies.

66. In the event of illness, or incapacity of the keeper, he is to notify the Department, stating at the same time what arrangement is being made for the main-

tenance of the aid to navigation of which he may be in charge.

67. No lightkeeper will be allowed to perform his duties by substitute, except as intimated in paragraph 66 above, without authority from the Department and such permission will be given only under exceptionally urgent circumstances and for limited periods.

68. No buildings shall be erected, nor the colour of any structure changed; nor trees cut down nor any other changes made on lighthouse premises without authority. In no case will a keeper be allowed to erect any private building on the lighthouse property unless special written permission has been previously obtained, and where such permission is obtained, the officers of the Department must be satisfied that the building will be of a character not discreditable to the station.

69. Under no circumstances will a lightkeeper or his heirs be made any allowance for improvements made at the station, nor can he or they exercise any right of property over any private building erected, and the Department need not allow the removal of such building, nor will it recompense the builder unless the structure is required for Government use.

70. Lightkeepers will give strict attention to the matter of keeping records and making reports as required. Full directions will be found on the report forms provided.

71. If any accident occurs that may require immediate attention, the keeper is to notify the District Marine Agent at once and forward a detailed report as soon as possible.

72. Lightkeepers occupying dwellings provided by the Department are prohibited from having boarders or lodgers therein except Departmental officials or others engaged in work at the stations.

73. If a boat is maintained at any station the keeper must keep it in good order, make all minor repairs, and keep it properly painted. He will also be held responsible for any preventible damage, including damage by storm or by exposure to the weather. It must be

properly and promptly housed or covered and kept on suitable bearings; and may not be used for any private enterprise of the keeper

74. Keepers must take charge of any buoys or beacons in their neighbourhood if so required; and, if any keeper should know of any buoy being carried away or moved from its proper place, he must give immediate notice to the District Marine Agent, and, when in his power, he should have it replaced.

75. Keepers are enjoined to render every assistance in their power to vessels in distress, and are to report at once to the District Marine Agent any shipwreck or accident that may happen to vessels in the neighbourhood of their stations, giving as circumstantially as possible the facts, and the cause thereof, and whether the light or lighthouse was visible to the vessel at the time of the disaster.

76. Keepers must conduct themselves with civility to strangers and shall, without charge, show the premises at such hours as do not interfere with the proper discharge of their duties, but visitors shall not be permitted to touch any part of the apparatus or to deface any part of the buildings; and not more than three visitors shall be allowed access to any lightroom at any one time. Lights, fog alarms and other apparatus are not to be placed in operation for visitors, nor are visitors to be admitted to any engine room or fog signal house while fog signals are in operation.

77. Every keeper will be provided with a copy of these Rules and Instructions which is to be kept readily available in each tower. The keeper is to see that he has a thorough knowledge of the contents and will instruct his assistant, if any, in the proper performance of his duties in accordance with these Instructions.

78. The breach of any of the foregoing Rules and Instructions will subject a keeper to dismissal or such other disciplinary action as the nature of the offense may require. Lightkeepers are to observe, however, that these Rules and Instructions are general and not intended to conflict with special written instructions which may be given to the keeper of any particular

lighthouse or such orders as may be issued from time to time by the Department of Transport.

79. In addition to these Rules and Instructions, Lightkeepers are referred to the Regulations Governing Landing, Storage, and Use of Oils and Fuels at Government Lighthouses, Fog Alarms, and Depots.

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Section

PART II

RULES AND INSTRUCTIONS

FOR

LIGHTKEEPERS IN CHARGE

OF

MECHANICALLY OPERATED FOG ALARMS

1. The following Rules and Instructions have been framed for the guidance of Lightkeepers in charge of fog alarms.

Throughout the text the Officer-in-Charge of the fog alarm machinery is referred to as the 'engineer' or 'keeper'. This will, in most cases, mean the lightkeeper, as his qualifications are, as a rule, supposed to be such as will allow him to be in full charge of the plant both as regards its operation and maintenance.

2. The duties of those in charge of fog alarms are of a most important and responsible kind involving to a very great extent the safety of life and security of property, and the Rules and Instructions laid down in this regard are to be carefully noted and strictly adhered to.

3. Failure to act promptly and as befits a man of ordinary skill and good judgment will not be excused, should any unforeseen condition arise which is not covered by these regulations.

4. Under no circumstances is any fog alarm station to be left, even temporarily, without at least one able-bodied man in charge, capable of operating both the alarm and the light.

An assistant is not to be left in sole charge of a fog alarm station during the temporary absence of the keeper until the lightkeeper is satisfied that his assistant is thoroughly competent in the operation of the equipment.

5. At all times night and day during the season of commission for any fog alarm station, a careful watch on the weather is to be maintained and on no account whatever is this regulation to be broken, even during prevailing clear weather.

6. At all times, every reasonable effort is to be made to protect the property of the Department from damage and such supervision is to be kept over stores as will prevent loss from wasteful use, theft, etc.

7. Should the supply of fuel or water at any time appear to be getting short so as to endanger the efficient working of the alarm, the matter is to be reported as soon as possible to the District Marine Agent, and the Lightkeeper will, until instructions are received from the Department, use his own discretion in making such arrangements (as may be necessary under the circumstances), that the best possible service be obtained.

8. An exact record of the operation of the fog alarm plant is to be kept on the forms provided for that purpose which are to be filled in and returned as may be directed. The records kept will show exactly, the day and hour when thick weather sets in and when the weather cleared, the starting and stopping of the alarm, fuel used; also, under the heading 'Remarks', will be set out the weather conditions or other circumstance which necessitated the operation of the alarm and any occurrence such as accidents to machinery, wrecks in the neighbourhood, etc., etc. Other forms supplied will make provision for recording, in a detailed manner, the operation and maintenance of the plant and all information in this respect is to be filled in as accurately as possible and forwarded as directed. Copies of all records are to be kept at the station and carefully preserved from year to year.

9. When the weather conditions are such, from fog, snow, smoke from forest fires, etc., as to cause the land to be indistinct by day or lights by night, the alarm must be in operation and continue so until the weather clears, and, if there be any reason to believe that thick weather prevails within the range covered by the fog alarm, it is to be in operation even though the weather be clear at the station.

10. At all times, when thick weather may reasonably be expected, the air pressure at stations where diaphones are established is to be kept above twenty-five pounds.

When, on the weather clearing, the alarm has ceased sounding, the air pressure is to be raised to thirty pounds. Engines are to be stopped by closing off the fuel, the ignition switch being kept closed till they have ceased turning.

OIL ENGINE DRIVEN PLANTS

11. Whenever it becomes necessary to start up an oil driven plant, the Engineer will first see that all lubricators are filled and working properly, that the water in engine cooling tank is above the top circulation opening and that the cocks between this tank and engine are open, drains being closed. He will, also, see that all necessary belts are in place and that the valves or cocks on main air lines and compressor discharge lines are open.

In the case of Radiator Cooled Engines, the keeper shall ensure that the radiator is filled with water and the fan belt in position and tight enough to obviate the possibility of the engine overheating through a slipping fan belt.

12. Since most Kerosene Oil Engines are started on gasoline, caution should be observed when priming the engine and any gasoline spilled at the time must be cleaned up before attempting to start the engine to minimize the risk of fire. Cans used to contain gasoline for this purpose should be clearly marked or painted red to indicate their contents and should be kept in a safe place. Such cans should be small and of a capacity not greater than one pint. (See ''Instructions regarding fuels, etc.'')

13. The engineer and all others who stand a watch in the engine room must know the signal advertised to be given by the alarm, and, during the operation of the plant, the time of the signal is to be checked at least once each watch, and necessary adjustments made promptly.

14. The engineer on watch must remain in the fog alarm building continuously, being relieved for meals, etc., by a man competent to handle the machinery.

15. At intervals of not more than half an hour, the Engineer shall go over the running machinery, checking

all working parts, temperatures, the flow of water in the cooling system and the air pressure, the latter as a criterion of the proper working of the diaphone and compressor.

During prolonged hours of operation, the quantity of water in cooling tanks, cisterns and radiators should be frequently checked.

16. On stopping the plant, it will be the duty of the Engineer to examine carefully all the machinery which has been in operation, to make sure that all joints, etc., are tight; and should anything be found to have worked loose, or become deranged, it is to be put right immediately.

17. As soon as possible after stopping the plant, all machinery is to be properly cleaned and serviced ready for operating on short notice, and the fog alarm building made clean and tidy.

18. On stopping the alarm in frosty weather, all drains are to be opened and the Engineer is to make sure that all circulation jackets, pump chambers, etc., are clear of water.

19. Lubricators, rims of fly wheels and all finished work about compressors and pumps are to be kept polished. All paint work about the machines is to be kept clean, the paint being renewed as often as necessary. Any leaks found in pipe lines are to be made tight at once.

MAINTENANCE OF MACHINERY IN GENERAL

20. Lightkeepers, and their assistants, will be held responsible for the proper care and maintenance of all machinery at the station. As most installations are made in duplicate, the keeper should alternate the running of the machinery whenever possible, that is if the Number 1 engine is run on one day for say four hours, Number 2 engine should be used next time the sounding of the fog signal is required, and a record of the hours of running should be kept to ensure that an equal amount of work is done by both units as far as is practicable.

21. At regular intervals, depending on the hours of running, starting and operating conditions or loss of power, the cylinder head should be removed and the piston withdrawn and thoroughly cleaned of all carbon deposit If a heavy deposit of carbon appears in the piston ring grooves, the rings should be carefully removed and cleaned, the grooves in the piston scraped out and the rings replaced in the same order.

Any piston ring showing strain or carbon deposit on the surface in contact with the cylinder wall should be discarded and a new ring fitted carefully observing that the gap, when measured with the ring at the bottom of the cylinder, is not excessive.

Whilst the engine is opened, the crank pin and connecting rod bearing should be examined for scoring or other signs of wear, and, when re-assembling, care should be taken that the bearing cap is refitted the same way as before, and the nuts pulled up tight and fitted with the proper sized cotter pin, neatly opened and turned back.

The valves and valve springs should be removed and cleaned, and the valve seats carefully examined. The valve springs should be checked for length, one against the other and, if available, against a new one. If any spring, upon examination, should appear appreciably shorter than the other, or shorter than a new one, it should be replaced. Particular attention should be paid to the exhaust valve because of its greater susceptibility to damage from the hot gases.

After cleaning thoroughly, the valves and valve seats, if not seating properly, should be ground in with an appropriate grade of grinding compound, and, when a good seating is obtained, should be washed in kerosene to remove all abrasive, oiled and re-assembled with their respective valve springs. The cylinder should then be lightly smeared with oil and the cylinder head gasket replaced and the cylinder head tightened down evenly. The spark plug or igniters should be cleaned and the gaps set to the manufacturer's tolerances and the whole engine cleaned up and made presentable.

22. Where Diesel engines are in operation, the water discharge temperature must be checked closely and kept to the manufacturer's recommendation, in order to get clean combustion. These engines are all pressure lubricated and, if at any time, the pressure gauge

should drop below operating pressure, immediate action should be taken to change over to the other unit to try to locate the trouble. Any difficulty with the operation of these units should be immediately reported to the District Marine Agent.

The fuel pumps and injectors fitted to Diesel engines must not be dismantled by the Engineer as special tools are required to adjust them when re-assembling. The injectors may be removed from head of engine and cleared with wire picker as conditions require. Fuel and oil filters should be periodically examined and cleaned or changed, when necessary.

23. Compressors, although not so susceptible to the accumulation of carbon as a kerosene oil engine, should, nevertheless, be stripped down and cleaned as the occasion permits. Cylinder heads should be removed and the piston head and cylinder head cleaned of all carbon deposit. If air pressure is not being maintained, the rings should be examined, also the valves. Normally, the valves of an air compressor give little trouble other than from carbon deposits, and care should be exercised when cleaning to avoid damage. Kerosene oil will be found useful in softening carbon that has hardened on valve surfaces, and, if the Handbook or Instruction Manual for the compressor is available, frequent reference should be made to it to ensure correct replacement of the valve parts.

Air-cooled compressors usually run faster and hotter than water-cooled compressors. This will result in greater condensation especially in a humid atmosphere and the keeper should, before starting away, release the small petcock in the bottom of the air discharge line in order that any condensation may drain away. Close attention should be paid to the crankcase oil which should not be allowed to become dirty or impregnated with sludge. At least once every 300 hours of running, the oil should be drained off, preferably after shutting down, whilst the oil is still warm. If the oil is very dirty and contains sludge or other sediment, the cover plate must be removed and the crankcase cleaned out, before refilling with the appropriate grade of oil.

Belts driving the compressors should be kept free from oil or grease and stretch should be taken care of to avoid slipping. A slipping belt is likely to be thrown off the pulleys; this, even if not excessive, will cause a drop in air output, and the risk of over-

heating the belt and consequent damage to the leather. Pulleys on both engine and compressor, therefore, must be kept free from oil or grease and patent belt fastenings or laces made neat and tidy, and smoothed on the undersides to avoid the danger of the belt being thrown off. Belts must be kept tight enough to obviate the possibility of slipping, but must not be so tight as to create an excessive load on the bearings of either engine or compressor.

24. Pumps: Triplex pump cylinders and valve boxes are to be opened up frequently for inspection and cleaning. All rust must be removed and the bearings and valves examined. Particular care should be exercised in the case of centrifugal pumps to ensure that wear on the rotor shaft does not cause excessive end play. Bearings of all pumps must be well lubricated with the appropriate grade of oil or grease as the case may be.

25. Oil engine ignitors or spark plugs are to be removed and cleaned after 100 hours of operation or oftener if necessary. Ignition batteries, where provided, should be tested frequently with a voltmeter. Care should be taken to keep oil and grease away from magnetos and high tension wires and the points of the magneto should be checked and adjusted, if required, at frequent intervals.

26. Where a diaphone forms part of the equipment of a fog alarm, it, with the operating valves, is to be opened out and inspected at regular intervals. The inside of the diaphone and the piston are to be cleaned frequently, using, for the purpose, a linen or cotton cloth soaked in kerosene. The operating valve, itself, if showing signs of improper seating, should be ground in using an appropriate grade of grinding paste and the rubber diaphragms, if found to be cracked, should be renewed. Where spare pistons are provided, they should be rotated.

27. Electric generators must be kept clean, free from dust and all foreign matter such as fluff, waste, etc. Commutators must be kept smooth, clean and free from excessive accumulations of oil. The brushes should have a good bearing fit on the commutators and, if they become rough or uneven, they must be refitted, using, for this purpose, fine sand paper but, when such material has been employed on commutators or

brushes, great care must be taken to remove all traces of grit and to see that the bearings are clear of all foreign matter. Emery cloth must not be used for this purpose.

28. Sparking at commutators is quite common with generators and should, unless very slight, be corrected at once. The principal causes for this trouble are:- dirty or rough commutators or brushes, brushes not properly fitted, or machine overloaded.

29. If the generator be overloaded, excessive sparking at the commutator will result and, further, there is danger of 'burning out' the armature and general overheating. To avoid this, it is to be noted that no lights or devices, other than those provided for in the original installation, are to be connected to the machine without written authority from the Department, and, in asking for such authority, the Engineer must give full particulars of the generator number and wattage of lamps already installed and whether any other device is electrically driven.

30. Once each watch, the various electric connections on the generator and on the switchboard are to be examined and, if any are found loose, they are to be immediately tightened.

31. All air tanks should be periodically opened up and examined internally for rust, or corrosion, and cleaned of any sludge, etc. If any rust or scale is found, it should be scraped and wire brushed, and painted with red lead or boiled linseed oil. The bottom drain is to be opened frequently to clear tank of any water due to condensation.

32. During prevailing clear weather, all the machinery at each station is to be put in operation once each week, the alarm being sounded for a few blasts before closing down.

LAYING UP FOR THE WINTER

33. When a station is to be laid up for the winter season, there is frequently a short period between the the time of closing down and the time the keeper is removed from the station. The keeper should, therefore,

prepare himself and his equipment in advance as far as possible so as to avoid delaying the relief vessel, and, as soon as the expected date of his relief is known, the keeper shall proceed to lay up his equipment as follows, leaving one unit available for use in emergency until the last moment.

34. Kerosene oil and diesel engines shall be opened up, the cylinder heads cleaned of carbon, the piston and connecting rod removed and the piston rings removed, if necessary, and thoroughly cleaned of carbon. Care should be taken when re-assembling the crank-pin bearing that the liners are re-inserted in the same way as before and the nuts tightened down solidly and cotter-pinned with cotter pins of correct size. The cylinder walls, piston, rings and bearing should be lightly oiled before re-assembly and the engine closed up.

Old engine oil should be drained from the crankcase which, if accessible, should be cleaned with kerosene oil. Otherwise, the crankcase should be flushed out with a mixture of kerosene and engine oil, two parts of kerosene to one part oil and the drain plug left open. A notice indicating ''No oil'' should be displayed on the engine to obviate the possibility of starting up next season without first filling crankcase.

35. Compressors are also to be opened up and examined as has already been described above. Base lubricated compressors are to be drained and cleaned or flushed out and dried. A notice indicating ''No oil'' should be similarly displayed and firmly attached to the compressors.

36. Where a diaphone or Tyfon is installed, the Engineer will, before leaving the station, remove the piston from the diaphone or the diaphragms from the Tyfon as the case may be, the valves and diaphragms from the operating valves and after cleaning them carefully, store them away in a safe place. The insides of the diaphone or Tyfon are to be cleaned and the iron parts oiled to prevent rust. Two thicknesses of stout canvas are to be securely fastened across the end of the resonator, the operating valves cleaned and oiled as was the diaphone and closed up.

37. At all such stations, the time devices are to be

cleaned and oiled and secured against dust; the counter-shafting driving them is to be cleaned and oiled.

38. All pumps are to be opened out, packing removed, and carefully drained of water, and all iron parts where not painted are to be well oiled, bright work being first polished.

39. Where countershafts are used at a station, the shaft itself should be kept clean and lightly smeared with an oily rag to prevent the formation of rust. Hangar bearings should be kept clean and the oil bottles filled with oil. All belts after cleaning should be removed from their pulleys, tied up out of the way, and their condition noted.

40. At all stations, the Engineer is to make sure when the plant is laid up that all drains are open and that no water is left in any portions of the machinery or pipes. Should there be any doubt that any portion does not properly drain, the necessary joints are to be broken for this purpose.

41. The keeper should endeavour, in the limited time at his disposal immediately before closing down, to do as much of this work as he can to all his equipment. It should be kept in mind that, upon opening of navigation next season, he will be expected to have his station ready for operation almost immediately upon landing, and there will be little time available then for such work. He should take careful stock of the condition of his equipment and any such parts as may be required must be noted carefully and reported to the District Marine Agent. Whilst the keeper will not be held responsible for losses or damage to the equipment in his absence during the winter season, he will be held accountable to the Department for any damage caused through neglect or carelessness in laying up of the equipment.

42. Where a station is unwatched during the winter, the Engineer will make sure before leaving that all doors, windows, etc., are properly secured and that everything is done to protect Government property during the winter season. He shall also leave the engine room and all other parts of the fog alarm building in a clean and tidy condition.

43. At stations where the staff remains during the winter, the plant and power house should be examined at least once a week so that any source of trouble may be corrected at once.

44. Where stations are provided with winches, these machines are to be operated and cared for in the same manner as the regular fog alarm plant insofar as applies to their case.

45. All water pipes above ground and outside the fog alarm building are to be scraped and painted at least once a year or otherwise treated as the Department shall direct. In frosty weather, they are to be kept drained except when actually required and, should it be found that any of these pipes will not drain properly, it will be the duty of the Engineer to fit the necessary drains at the earliest possible moment, applying to the District Marine Agent for all necessary material.

46. When ordering parts for machinery, pipe fittings, etc., the Engineer must give full particulars of what is required. In the case of parts for machines, as well as describing the part, he will give the horsepower or size of the machine with its shop number, and, if available, the part number from the spare part catalogue. When requisitioning for discs for globe valves, not only must the size of the valve be specified but also the make. The same applies to parts for lubricators, etc., where the maker's name, number or distinguishing mark of lubricator and size of connections, are to be given. The reason why any part is required must also be stated fully with the date when the last supply was made.

47. On the occasion of the visit of an Inspector or any other duly appointed officer of the Department, it shall be the duty of the Engineer to render such officer all the assistance he may require and, further, he shall carry out such repairs or work as he may then be instructed to do.

OTHER SPECIALIZED EQUIPMENT

48. Of recent years, a number of electrical devices have been put into service throughout the Dominion among which are the Cunningham Air Whistle, the Wall-

ace and Tiernan Fog-Trumpet and various Wallace and Tiernan lights, some information on which is appended below.

49. Cunningham Air Whistle

The Cunningham Air Whistle is a combined motor and rotary compressor with a small air-whistle attached, controlled independently by a separate timer. The rotor blades of the compressor consist of four movable bronze fins which have a tendency to build up a ridge on the edge in contact with the compressor wall. This ridge should be periodically removed by the Keeper with a smooth file and after cleaning carefully must be replaced in the same order as before and the cylinder well oiled and closed up. Oiling for the compressor is most important and the keeper must ensure that the oil bottle is kept full of the correct grade of oil or overheating and seizing will occur. With proper care as mentioned above, this whistle will give a long period of trouble-free service and should not require periodic depot overhaul.

50. Wallace and Tiernan Fog-Trumpet

This trumpet is designed to operate on 14-16 volts, D.C., powered usually by lead-acid batteries or Edison cells. H.A.500.

It requires special service tools and should not be tampered with by the Keeper but should be returned to the Agency for repairs annually or when, in the opinion of the Keeper, this action appears necessary due to loss of volume, distorted signal or any warning signs of failure. The voltage of the batteries, however, should be frequently checked with a volt-meter to ensure that they do not fall below 14 volts.

51. Wallace and Tiernan Lights

These electrically operated lights consist usually of a bulb-changing mechanism with a complement of four bulbs and, frequently, a flasher motor where a flashing light is required. No attempt to service these lights should be made by the Keeper except to clean the lens, if provided with one, or to check the batteries from time to time, or to replace a burned out bulb, as special tools are required for both repairs and adjustments.

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Section

PART III

INSTRUCTIONS TO GUIDE LIGHTKEEPERS IN THE OPERATION OF HAND FOG HORNS AND BELLS, MECHANICAL BELLS, RADIO-PHONES AND RADIO BEACONS

1. At stations where mechanical fog bells are established, the lightkeeper will put the bell in operation immediately thick weather is observed within the range covered by the signal. If the bell has an advertised characteristic, it is to be checked frequently and any error corrected immediately.

2. At stations where hand fog horns and bells are established, the lightkeeper will operate the signal in response to signals received from vessels during thick weather; that is, when a vessel is heard blowing, the lightkeeper is to reply with the hand horn or bell as the case may be.

3. The automatic radio beacon is to be operated on its assigned sequence during clear weather, on the clear weather schedule. Whenever the atmosphere in the vicinity of the station is so obscure as to impede navigation, the radio beacon will operate continuously maintaining the uniform time cycle of 3 minutes

4. The lightkeeper and his assistant are to check the operation of the beacon at frequent intervals, preferably on the hour. Clocks are to be checked with the regular time signals.

5. The alternate transmitter is to be immediately placed in operation in the event the one in use fails. The faulty transmitter is to be immediately repaired and made ready for use when needed.

6. At stations where there is a radio beacon operator as well as a lightkeeper, the operator is responsible for maintaining fog and clear weather schedules between 8 a.m., and 10 p.m., local time, and the keeper and his assistant at all other times. The operator is entirely responsible for the care and maintenance of radio beacon apparatus, and for all duties laid down in ''Operating Instructions for Automatic Radio Beacon Equipment''.

During their hours of watch, lightkeepers and operators are required to visit the beacon room each hour to watch the apparatus perform its schedule, and to satisfy themselves that signals are being properly transmitted. The operator must be prepared to be called out at any time during the night, should it be discovered that the radio beacon apparatus has failed to operate and to carry out such repairs or adjustments as may be required to put his equipment again in operating condition.

7. At stations where radiophones are installed, the keeper will be expected to handle the instrument with due care and attention, will not allow unauthorized persons to tamper with the controls and will obey the instructions given him by the technician at the time of the installation or any subsequent inspection. Particular attention should be paid to these instructions and to the recharging of the batteries as well as to the generator or wind-charger, whichever is supplied. Instructions regarding feathering the vanes of a wind-charger under gale conditions must be adhered to and inspection of the charging equipment should be carried out immediately if it is thought that damage from storm conditions may have occurred.

Keepers are especially reminded that the radiophone is installed to provide them with a link with civilization, to be used as their schedule demands and in an emergency. The instrument must, therefore, be carefully handled and tended, must not be used for frivolous or unnecessary purposes and must be maintained in good condition against any unforeseen emergency that may arise.

PART IV

RULES GOVERNING BUOYS

ADOPTED UNIFORMLY THROUGHOUT CANADA

UNIFORM SYSTEM

1. A uniform system of buoys has been adopted for the Navigable Waters (both coastal and inland) of the North American Continent (Washington Marine Conference 1889).

DEFINITION OF STARBOARD AND PORT HAND

2. The term Starboard Hand shall denote that side which would be on the right hand of the mariner going with the main stream of flood, or in entering a river, harbour or estuary from seaward, or, in tideless rivers, in going against the stream, or, in lakes, in going from the outlet towards the head of the lake. The term Port Hand shall denote the left hand of the mariner under the same circumstances.

(In British Columbia coastal waters, the ebb tide is taken to flow southward).

SHAPES OF BUOYS

3. Buoys showing the pointed top of a cone above water shall be called Conical and shall always be starboard hand buoys, as above defined; Buoys showing a a flat top above water shall be called Can; those showing a domed top above the water shall be called Spherical; and those showing only a mast above water shall be called Spar buoys.

SPECIAL SHAPES

4. Buoys having a tall central structure on a broad base shall be called Pillar Buoys and like other special buoys, such as Lighted buoys, Bell buoys, Gas buoys and Whistling buoys, etc., shall be placed to mark special positions, which will be fully described when the buoys are placed. With the exception of Conical buoys, which, when used, shall always be starboard hand buoys, Conical topmarks, which shall always be starboard hand, or cylindrical topmarks, which shall always be port hand, as herein mentioned, the shapes of buoys or beacons shall have no special significance at

present in Canada. Lighted starboard hand buoys shall carry red lights and port hand buoys white lights, except where special circumstances require otherwise. These instances will be covered in List of Lights and Notices to Mariners.

COLOURING AND NUMBERING

5. Starboard hand buoys shall be painted red, and, if numbered, shall be marked with even numbers. Port hand buoys shall be painted black with odd numbers, if any. Buoys defining middle grounds shall be painted with red and black horizontal bands and may be passed on either hand.

MID-CHANNEL BUOYS

6. Mid-channel or Fairways buoys are to be painted in white and black vertical stripes and may be passed on either hand.

NUMBERS, LETTERS AND NAMES

7. Numbers, letters or names may be painted on the buoys, but they must never be so large as to interfere with their distinctive colouring. Wherever numbers or letters are used, they shall be in consecutive order, commencing from seaward.

TOP MARKS

8. Where topmarks are used on buoys, they shall in no way conflict with the above regulations. Top marks resembling a cone are to be used on the Starboard side, and those resembling a cylinder on the Port side of the channel. Any other distinguishing marks of buoys will be used to mark particular spots, a detailed description of which will be given when the mark is first established.

WRECK BUOYS

9. All buoys used for the marking of wrecks, shall be painted a green colour, with a suitable white inscription, and shall be moored, when possible, near the side of the wreck next to mid-channel. Lighted wreck buoys shall carry green lights.

PART V

REGULATIONS GOVERNING LANDING, STORAGE AND USE OF OILS AND FUELS AT GOVERNMENT LIGHTHOUSES, FOG ALARMS AND DEPOTS

LANDING SUPPLIES (Storage in Drums)

(a) All fuel oils and lubricating oils shall be supplied in approved steel drums the capacity of which shall not exceed 45 gallons and shall be supplied full to capacity.

(b) The contents of the drum shall be plainly printed on the top and sides in letters not smaller than 2 inches in height. In addition, fuel oils shall be marked with a contrasting colour in the form of a band around the top not smaller than 2 inches in width.

(c) Immediately after landing, all drums shall be examined for tightness of bung and leaks, and any leakers shall be set aside from the main store to be used first. If any leaks occur around the top or bottom, the drums should be laid on their sides in order that the leaky part shall be at the top, to minimize loss.

(d) No smoking or carrying of matches, lighted oil lamps, etc. shall be permitted during landing operations and NO SMOKING signs shall be in evidence around the area designated as storage space.

(e) Drums containing gasoline shall not be stored together with others containing Kerosene, Stove oil or other Fuel oils. If stored in the open, the site should be as distant from any building as is practicable and grass, weeds or brush must be kept clear from the area.

(f) Spillage must be immediately cleaned up and collected by spreading sand or dirt over the area and then removing it. In the case of gasoline spillage the loss shall be estimated and reported to the person in charge of landing operations.

LANDING SUPPLIES: (Storage tanks)

(a) When landing combustible fuels into storage tanks, compressed air shall not under any circumstances be used to blow out or otherwise remove the contents from the drums to the storage tanks.

(b) Where provided, a hand-operated or mechanical pump may be used to transfer fuel from the drums into a suitable closed container and thence to the storage tank in which case, the container must be equipped with a metal handle which will hang onto the spout or delivery nozzle of the pump to ensure good electrical connection before the fuel is pumped out to minimize the risk of fire caused by static electricity. In addition, the container shall also be grounded by attaching a wire by means of an approved clip to the handle of same before the container is emptied into the storage tanks.

(c) All storage tanks shall be satisfactorily grounded by means of a No. 6 Soft Drawn Bare Copper Wire and connected to the storage tank by an approved type of ground connector. Grounding wires to be attached to portable container before emptying shall be No. 4 Bare Stranded Flexible Cable and attached to the container by an approved type of universal clip.

(d) Where a hose is provided to fill storage tanks from the pump or in cases where engine tanks are filled direct from the storage tank, the hose shall be of the anti-static type and connection between the nozzle of the hose and the receiving tank shall be ensured before transferring fuel oils or gasoline from one tank to another. All hose connections including nozzle shall be spark-proof metal; steel shall on no account be used.

(e) NO SMOKING shall be permitted on any premises where oil, gasoline or fuel oil is stored, and no lighted lamps except those of a safety type shall be allowed in close proximity. (Combustible vapours are heavier than air and have been known to be the cause of Flash Fires caused by spark, etc. over 500 feet distant).

(f) All electrical switch gear, motors, wiring outlets, etc. used in the vicinity of storage tanks, oil

drums or containers shall be of the explosion-proof type. No portable electric light shall be brought into the vicinity of storage tanks, oil drums or like containers unless it is of the explosion-proof type.

(g) Fire-fighting appliances such as fire buckets filled with dry clean sand and/or chemical extinguishers of a type suitable for Class B Fires, i.e. gasoline, oils, greases, etc. shall be on hand within easy reach during landing operations, both on shore and on board ship. On no account should water be used in fire buckets since the application of water to oil fires tends to spread the flames.

GENERAL REGULATIONS TO BE OBSERVED BY KEEPERS WHERE OILS, GASOLINE AND GREASES ARE STORED IN BULK.

(a) All buildings in which gasoline, oil fuels, greases, etc. are stored shall be constructed of fire-proof materials. Storage sheds built of galvanized iron attached to wooden studs shall be acceptable but all woodwork must be well painted with Fire-retardant Paint of an approved quality.

(b) 'NO SMOKING' notices shall be prominently displayed on all buildings containing flammable fluids and fire buckets containing clean dry sand or earth shall be provided near the entrance and exit of every such building. Said fire buckets shall be inspected periodically and the sand if contaminated with rubbish or other flammable materials shall be emptied out and refilled with clean dry sand, or earth. Such inspections shall be made at least once every second day and the keeper shall be held responsible for the carrying out of this duty.

(c) Where provided, chemical extinguishers of the manual or automatic type shall be examined and checked at frequent intervals and a spare refill cartridge of the correct type shall be kept on hand by the light-keeper. Where automatic type extinguishers are connected to an electrical circuit to provide a warning signal, the electrical circuit shall be tested and the bell or warning sounded once every day to ensure that no break in the circuit sufficient to render the system inoperative has occurred.

(d) Where a night watchman is employed in any government depot, it shall be part of his regular duties to check any automatic electric fire alarm device as outlined above in paragraph (c) once each night during his rounds and the fact reported whether a fault has developed in the system or not.

(e) Gasoline shall not be used for cleaning purposes in any dwelling, engine room, garage or other enclosed structure.

(f) Oily rags, cotton waste or any cleaning materials used for wiping the hands or wiping up spilled oil, gasoline or greases shall not be deposited in any container or left lying around in any building where oil, gasoline or grease is stored. All such oily or greasy waste shall be deposited in a closed metal container outside the building or outside that part of the building where oil, gasoline or grease is usually stored. Such refuse shall not be allowed to accumulate in the container but shall be emptied frequently in order to minimize the risk of fire close to the buildings.

(g) Where storage tanks are contained in the basement of a dwelling or any building in which workmen or other persons are required to live, or carry out their required duties, each storage tank shall be vented separately and each vent shall terminate at least 12 feet above the highest ceiling of any room in the building in which the workmen or other persons are likely to be working or living. In addition, each vent pipe shall be fitted with an approved type of flame arrester and provision made to ensure that foreign matter cannot enter and obstruct the safe passage of flammable vapours.

(h) In cases where storage tanks are buried in or nested in soil or contained in a separate hut, shed or storage building, each tank shall be separately vented as in paragraph (g) and each pipe shall terminate at least 12 feet above grade or in the case of a building, at least 6 feet above the highest point of the roof and fitted with an approved type of flame arrester.

(i) In addition to the above, all vents from storage tanks shall be so arranged that no pipe shall be vented less than 2 feet away from any doorway, window or any other opening into the building.

(j) No electrical fitting, appliance, motor, etc. either permanently fitted or portable shall be used in any building housing storage tanks containing flammable liquids unless they are of an approved explosion-proof type. No portable electric lamp shall be connected to any outlet, neither shall any burnt-out bulb be changed and a new one inserted unless the electric current is turned off before inserting the portable lamp plug into the outlet or inserting a new bulb into its socket.

(k) When drawing off flammable liquids from storage tanks, regulations as outlined in 'Landing Supplies:- (Storage Tanks), paragraphs (b) and (c) shall apply in general unless the quantities concerned are less than 2 gallons. In all cases irrespective of quantity, open containers such as buckets, cans, etc. must never be used to transfer such liquids from one container to another. Separate containers plainly marked or painted in colours to match the colour of the original drum shall be used for transferring flammable fluids from one container to another and must be of an approved, closed type fitted with a spout or nozzle made of a non-sparking metal.

Attention must be drawn to the fact that a gasoline container is most dangerous when it contains no gasoline because it may be full of explosive gas fumes.

By authority

Director of Marine Services
Department of Transport,
Ottawa, Canada,
1st March, 1953.