

During the year the Board of Trade of the United Kingdom formally recognized as having equal value with certificates of the same grades issued by the Board the first- and second-class motor certificates and endorsements, issued by the Department under the revised regulations relating to the examination of marine engineers which came into force on the 1st March, 1931.

The examinations for first and second-class ordinary and motor certificates, and also for third-class certificates, are now held at the four main centres only. Examinations for certificates of competency which are valid in New Zealand only are held at fifteen centres throughout the Dominion.

INSPECTION OF BOILERS AND MACHINERY.

Boilers and Pressure Vessels.

The following is a statement of the number of inspections made during the year, the corresponding figures for the previous year being shown in parentheses.

	Number.
Boiler and steam pressure vessels inspected for the first time	226 (261)
Air receivers inspected for the first time	142 (193)
Total inspections of all boilers and pressure vessels	7,914 (8,144)

Pending the issue of the land-boiler specifications which the British Standards Institution has now in hand and which the Department will consider adopting, amendments were made during the year to the land-boiler rules relating to stayed surfaces. The opportunity was taken to consolidate the various amendments which have been made from time to time to the Department's rules, and consolidated rules have now been printed and are available for purchase by the public. The amendments made to the rules conform to modern authoritative practice in land-boiler design, and the fact that they permit of the cost of construction being reduced will, no doubt, be appreciated in these times.

The only boiler explosion reported during the year was of a small low-pressure boiler used for generating vapour necessary for working timber in a boat-builder's yard. The boiler was not subject to inspection under the Inspection of Machinery Act. It exploded with considerable violence and was projected over a 6 ft. fence and landed 150 ft. away. The mishap appears to have been due to a pipe having been plugged. This pipe served the dual purpose of atmospheric pipe and filling-pipe. Fortunately, no person was injured, but the violence of the explosion illustrates the danger of tampering with the free exhaust of steam from boilers working at atmospheric pressure, of which there are a number now in use in farming districts for sterilizing purposes.

A mishap occurred early in the year to a large Lancashire boiler in a freezing-works. The boiler had been opened up for cleaning purposes over a week-end and shortly after it had been refilled and steam raised, several gusset-stay rivets were found leaking in the end-plate. The fires were drawn and it was found that each furnace tube had collapsed at the third course. A further examination inside the boiler showed that the furnace tops and sides were heavily coated with oil, and oil was adhering to the end-plates and shell at the water-level. The presence of oil in the boiler was the direct cause of the over-heating of the furnaces and the collapse of the plates. The boiler was filled from a tank supplied with condensate from the engines, with extra feed-water through a cock controlled automatically by a float. Oil was freely used in the engines and was skimmed from the feed-tank daily. It is assumed that when pumping up the boiler, the float-controlled cock failed to operate and the tank was emptied and the free oil pumped into the boiler. Since the accident a feed-water-treating plant, additional float cocks, and a low-water electric alarm signal have been installed in the feed-tank.

An air-receiver exploded in August, 1931. It was less than 5 cubic feet capacity and was, therefore, not subject to inspection under the Inspection of Machinery Act. The longitudinal joint, which was welded by the electric process, failed under working-pressure, and close examination of the joint after the explosion showed that the weld metal was not completely fused through the whole thickness of the plate. The explosion caused considerable material damage, but fortunately no person was injured.

Machinery.

The total number of machinery inspections for the year was 37,692. Among these 13 cranes and 27 lifts were inspected for the first time.

By the Inspection of Machinery Amendment Act, 1931, machinery used exclusively for farming purposes, the motive power of which does not exceed 6 horse-power, was exempted from annual inspection, and the inspection of this class of machinery ceased in November, 1931. Farming machinery is still, however, required by the Act to be so guarded as to afford adequate protection to all persons working the machinery or in connection therewith, or who may be in the vicinity thereof. The 1931 Amendment gives the Department power, which it did not hitherto have, to require that any machinery must be adequately guarded before it is sold or otherwise disposed of, and Inspectors of Machinery have instructions to report any farm machinery which is being sold without proper safety devices.

It is estimated that the exemption of this machinery has reduced the annual machinery inspections by approximately 24,200, and in consequence eight Inspectors were retired and the machinery districts throughout the Dominion rearranged. Offices in Gisborne and Timaru were closed, these districts being worked from Napier and Christchurch respectively.

There were reported during the year 5 fatal and 42 non-fatal accidents, the corresponding numbers for last year being 11 and 67 respectively. One fatality, asphyxiation by escaping gas from an ammonia-cylinder, which exploded due to a faulty forge weld, was not an accident in respect of which the Department has any responsibility, the defective cylinder being exempt from inspection. One