

1885.
NEW ZEALAND.

DEFECTIVE RAILWAY AXLES.

(CORRESPONDENCE AND MEMORANDA RELATIVE TO)

Presented to both Houses of the General Assembly by Command of His Excellency.

No. 1.

Memorandum by the STOREKEEPER, Public Works Department, to the ENGINEER-IN-CHIEF.

RE *Shipment of Eighty Pairs Wheels and Axles, ex "Invercargill."*

Public Works Office, Wellington, 12th March, 1884.

I have to report that one of these has been discharged from the ship, broken in the axle. The captain of the vessel informs me that it was found broken in the ship's hold, before removal therefrom, and he cannot say how it was done. An examination of the fracture shows that there were flaws on each side of the axle, one a half-inch and the other about a quarter-inch in depth. The iron itself is of very inferior quality, and has the appearance of coarse white pig-iron, instead of "the best clean scrap," as specified.

I would suggest that this pair be sent Home by the "Invercargill" to the Agent-General, and returned to the manufacturers (the Staffordshire Wheel and Axle Company), with a request that another pair be sent out by direct steamer to replace them.

I would remark that there are no external indications on the axle to show that it has had any blow or fall, or anything that would be evidence as to how it was broken; and, as the iron is so very inferior, it is a question for you to decide if a percentage of the whole shipment should not be tested before being sent away from Wellington to the different lines.

The Engineer-in-Chief.

P. PUTNAM.

No. 2.

The INSPECTING ENGINEER to the HON. THE MINISTER FOR PUBLIC WORKS.

Public Works Office, Wellington, 12th March, 1884.

It is recommended that the broken pair of wheels and axles be returned to the manufacturers, as proposed by the Storekeeper. From an examination of the fracture it appears to be almost certain that the broken axle has not been submitted to the tests specified in the English specification, and I recommend that the whole consignment be thus tested at the Petone workshops before its distribution.

The Hon. the Minister for Public Works.

C. B. KNORPP.

Minute by the Minister for Public Works.

Act accordingly—E. MITCHELSON.—13/3/84.

No. 3.

The ENGINEER-IN-CHIEF to the INSPECTING ENGINEER.

RE *testing Axles made by the Staffordshire Wheel and Axle Company.*

Public Works Office, Wellington, 27th May, 1884.

If these are tested in the way proposed, it will not be safe to use them for rolling stock, as you will observe that the Home specification provides that *two extra axles* shall be provided by the contractors for testing purposes, and it is clear that the axles so tested were not to be used as part of the contract quantity.

Please, therefore, to test *one axle* only, and, in choosing it, Mr. Putnam will shew you a pair of wheels and axle, in which one of the wheel bosses is cracked; this is the one I should test.

A claim could then be made on the contractors to supply two new axles, supposing the one tested proves to be good; if it breaks short, some further tests must be made.

Mr. Knorpp.

JOHN BLACKETT.

1—D. 2.

No. 4.

THE ENGINEER-IN-CHIEF to the HON. THE MINISTER FOR PUBLIC WORKS.

RE supply of Wheels and Axles by the Staffordshire Wheel and Axle Company.

Public Works Office, Wellington, 10th June, 1884.

IN a shipment of the above (80 pairs), received by the "Invercargill" one axle was found broken in the ship's hold, the fracture having occurred close to the inner face of one of the wheel naves, and square across the axle.

The fracture shewed a coarsely crystalline texture, with flaws on each side, and the axle was not bent in any way, and neither it, nor the wheels, shewed any marks of ill-usage.

The breakage, as above described, was of such an extraordinary nature, that it was determined to test a number of the axles in the same shipment, and from the same manufacturers. The test applied was of a similar character to that provided in the English specification, viz:—a weight of one ton falling through a space of 3 feet, the axle to receive three blows on one side, and two blows when reversed, *without breaking*, when resting on supports 3ft. 6in. apart.

As we could not arrange that the supports could be 3ft. 6in. apart, the wheels being in the way, distances respectively of 4ft. 3in., and 5ft. were adopted, the fall of the weight being in the former case 1ft. 10in., and in the latter 1ft. 4in. to 1ft. 5in., which would be equivalent to the English test. A schedule of the tests is attached, viz:—

Five, of axles marked "Staffordshire Wheel and Axle Company," including the one broken in the ship.

Three, of axles marked "Midland Iron Company."

Three, of axles marked "Lancaster Wagon Company." All of which were supplied under contract by the first and third-named firms.

Some old axles were also tested, by way of comparison, viz:—Two old axles, made in Dunedin, and one old axle, marked "S. W. & A. Co."

The last-named axle broke only after twenty blows, increasing in force up to a 7½ft. fall, and the two Dunedin axles broke respectively with twelve blows, and five blows, increasing in force up to 7ft. fall, and 6ft. fall.

Of the Staffordshire Wheel and Axle Company's axles, one broke with six blows, the first three of which were with a fall of only 1ft., two broke with three blows, and one broke with two blows.

Of the Midland Iron Company's, one broke with one blow, one broke with eight blows (increasing fall), and one broke with six blows.

Of the Lancaster Wagon Company's, one broke with twelve blows (increasing fall), and the other two both broke with five blows.

The result of these tests are so unsatisfactory, and so startling, that I dare not recommend the use of any of the axles supplied under the late contracts with the Staffordshire Wheel and Axle Company, and Lancaster Wagon Company, which latter includes those marked "Midland Iron Company."

Steps should be taken to have all these axles replaced with others, of the goodness of which there should be no doubt, and the contracting firms should, in my opinion, be called upon to supply them at their own charge.

The axles which have been broken under the tests should be sent Home, so that the Consulting Engineers, and others concerned, may see the inferior nature of the material supplied.

To save time, I should recommend also, that as many axles as possible may be made in New Zealand, at the various Government workshops, where such work could be executed, so that the imported wheels may be made available as speedily as possible.

The Hon. the Minister for Public Works.

JOHN BLACKETT.

P.S.—The report of the Inspecting Engineer is attached, also a Memorandum by the Storekeeper.

Enclosure 1 in No. 4.

The INSPECTING ENGINEER to the ENGINEER-IN-CHIEF.

SIR,—

Public Works Office, Wellington, 9th June, 1884.

I have the honor to enclose herewith the result of the testing of carriage axles, ex "British King," "Loch Ken," and "Invercargill."

Of the four axles tested of the Staffordshire Wheel and Axle Company, not one stood the very moderate test, but broke. One broke in the ship's hold. The fracture of these is coarsely crystalline, and the color of the iron, white.

Of the three axles tested of the Midland Iron Company, one stood the test corresponding to that of the English specification, but broke with a four feet drop. The fracture of these axles is crystalline. The crystals, however, are not so large as those of the Staffordshire axles, and there is some grey fibre in the axles that stood the specification test.

Of the three axles tested of the Lancaster Wagon Company, one stood the prescribed test, and did not break until a 5 feet drop was applied for the second time. The fracture of these axles was crystalline, and of a white colour in the middle, and fibrous grey in the outer part.

Attached is also the result of the tests of two similar axles made in Dunedin, and of an old axle marked "S. W. & A. Co.," which has been on the road for some time. These axles stood very severe tests, the fracture in each case being fibrous, and of a grey color. Another old axle, tested by Mr Ashcroft, did not break until a 7 feet drop had been applied repeatedly, and the fracture was grey and fibrous.

To the Engineer-in-Chief.

C. B. KNORPP.

Enclosure 1 in 1 of No. 4.

RESULT OF TESTING AXLES WITH A TON WEIGHT FALLING ON THEM.

1. Numbers of Axles Tested.	2. Brand on Axle.	3. Distance between Supports.	4. Height of Fall.	5. Number of Fall.	6. Deflection.	7. Character of Fracture.
A. 1	Staffordshire Wheel and Axle Company	Broke in ship's hold	Coarsely crystalline, with flaw.
B. 2	"	{ 4 feet 3 inches ...	1 foot	1st	$\frac{3}{16}$ inch	Coarsely crystalline, white
	"	{ " " " ...	"	2nd	$\frac{5}{8}$ inch	
	"	{ " " " ...	"	3rd	$\frac{7}{8}$ inch, total	
	"	{ " " " ...	1 foot 10 inches	4th	$1\frac{1}{4}$ inch, total	
	"	{ " " " ...	"	5th	$1\frac{3}{8}$ inch, total	
	"	{ " " " axle reversed, 180°	1 foot 10 inches	6th	Broke	
C. 3	"	{ 5 feet ...	1 foot 4 inches	1st	$\frac{3}{8}$ inch	Coarsely crystalline, white.
	"	{ " " " ...	"	2nd	$1\frac{1}{16}$ inch, total	
	"	{ " " " ...	"	3rd	Broke	
D. 4	"	{ 5 feet ...	1 foot 4 inches	1st	$\frac{3}{8}$ inch	Coarsely crystalline, white.
	"	{ " " " ...	"	2nd	$1\frac{1}{16}$ inch, total	
	"	{ " " " ...	"	3rd	Broke	
E. 5	"	{ 5 feet ...	1 foot 5 inches	1st	$\frac{1}{2}$ inch	Crystalline, white (coarse).
	"	{ " " " ...	"	2nd	Broke	
F. 1	Midland Iron Company	{ 4 feet 3 inches ...	1 foot 10 inches	1st	Broke	Coarsely crystalline, white.
	"	{ 5 feet ...	1 foot 4 inches	1st	$\frac{1}{16}$ inch	
	"	{ " " " ...	"	2nd	$\frac{1}{16}$ inch, total	
	"	{ " " " axle reversed, 180°	"	3rd	$1\frac{1}{4}$ inch, total	
	"	{ " " " same position	"	1st	Returned to $\frac{1}{16}$ inch	
	"	{ " " " "	2 feet	2nd	Returned to $\frac{1}{16}$ inch	
	"	{ " " " "	3 feet	3rd	$\frac{1}{16}$ inch below straight	
	"	{ " " " "	4 feet	4th	$1\frac{1}{8}$ inch below straight	
	"	{ " " " "	"	5th	Broke	
H. 3	"	{ 5 feet ...	1 foot 5 inches	1st	$\frac{1}{2}$ inch	Fibrous, with smaller crystals, grey and white mixed
	"	{ " " " ...	"	2nd	$\frac{1}{16}$ inch, total	
	"	{ " " " axle reversed, 180°	"	3rd	$1\frac{1}{4}$ inch, total	
	"	{ " " " same position	"	1st	Returned to $\frac{1}{4}$ inch	
	"	{ " " " "	2 feet	2nd	Returned to $\frac{1}{4}$ inch	
	"	{ " " " "	"	3rd	Broke	
I. 1	Lancaster Wagon Company	{ 5 feet ...	1 foot 4 inches	1st	$\frac{1}{4}$ inch	Fibrous, with smaller crystals, grey and white mixed flaw.
	"	{ " " " axle turned, 180°	"	2nd	$\frac{1}{16}$ inch, total	
	"	{ " " " same position	"	3rd	$1\frac{1}{4}$ inch, total	
	"	{ " " " "	"	1st	Returned to $\frac{1}{16}$ inch	
	"	{ " " " "	1 foot 5 inches	2nd	Returned to $\frac{1}{16}$ inch	
	"	{ " " " "	2 feet	3rd	$\frac{1}{16}$ inch below straight	
	"	{ " " " "	3 feet	4th	$1\frac{1}{8}$ inch below straight	
	"	{ " " " "	4 feet	5th	$2\frac{1}{8}$ inches below straight	
	"	{ " " " "	5 feet	6th	$3\frac{3}{8}$ inches below straight	
	"	{ " " " axle turned, 180°	4 feet	7th	$4\frac{1}{8}$ inches below straight	
	"	{ " " " same position	5 feet	1st	Returned to $3\frac{3}{8}$ inches	
	"	{ " " " "	"	2nd	Broke	

RESULT of TESTING AXLES with a TON WEIGHT, &c.—*continued.*

1. Numbers of Axles Tested.	2. Brand on Axle.	3. Distance between Supports.	4. Height of Fall.	5. Number of Fall.	6. Deflection.	7. Character of Fracture.
J. 2.	Lancaster Wagon Company	5 feet	1 foot 5 inches	1st	$\frac{1}{2}$ inch	Crystalline in middle, white fibre, grey outpart, three curved cracks.
	"	"	"	2nd	$1\frac{1}{4}$ inch	
	"	axle turned, 180°	"	3rd	$1\frac{1}{2}$ inch	
	"	same position	"	1st	Returned to $\frac{7}{8}$ inch Broke	
K. 3	"	"	"	2nd	$\frac{11}{16}$ inch	Small crystals, white, part fibrous grey
	"	"	"	1st	$1\frac{1}{16}$ inch, total	
	"	axle turned, 180°	"	2nd	$1\frac{1}{16}$ inch, total	
	"	same position	"	1st	Returned to $\frac{7}{8}$ inch Broke	
K. 1	Dunedin Axle	5 feet	"	1st	$\frac{3}{8}$ inch	All fibrous, grey.
	"	"	"	2nd	$1\frac{1}{8}$ inch	
	"	"	"	3rd	$2\frac{1}{4}$ inches	
	"	axle turned, 180°	"	1st	Returned to $1\frac{1}{8}$ inch	
	"	same position	"	2nd	Returned to $\frac{3}{8}$ inch	
	"	"	2 feet	3rd	$\frac{11}{16}$ inch below straight	
	"	"	3 feet	4th	$1\frac{1}{8}$ inch below straight	
	"	"	4 feet	5th	$3\frac{1}{4}$ inches below straight	
	"	"	5 feet	6th	5 inches below straight	
	"	"	6 feet	7th	7 inches below straight	
	"	axle turned, 180°	7 feet	9th	Broke	
	K. 2	"	5 feet	2 feet	1st	
"		"	3 feet	2nd	$2\frac{3}{8}$ inches	
"		"	4 feet	3rd	$4\frac{1}{16}$ inches	
"		"	5 feet	4th	$7\frac{1}{4}$ inches	
"		"	6 feet	5th	Broke	
Old	S. W. & A. Co.	"	1 foot 3 inches	1st	$\frac{1}{2}$ inch	Grey and fibrous.
	"	"	"	2nd	$1\frac{1}{4}$ inch, total	
	"	"	"	3rd	$1\frac{1}{2}$ inch, total	
	"	axle turned, 180°	"	1st	Returned to $\frac{3}{8}$ inch	
	"	same position	"	2nd	Returned to $\frac{1}{4}$ inch	
	"	"	2 feet	3rd	$\frac{1}{2}$ inch below straight	
	"	"	2 feet 6 inches	4th	$1\frac{1}{2}$ inch below straight	
	"	"	3 feet	5th	$2\frac{3}{4}$ inches below straight	
	"	"	3 feet 6 inches	6th	$3\frac{1}{2}$ inches below straight	
	"	"	4 feet	7th	5 inches below straight	
	"	axle turned, 180°	4 feet 6 inches	1st	Returned to $2\frac{1}{4}$ inches	
	"	"	5 feet	2nd	Returned to $1\frac{1}{8}$ inch	
	"	"	5 feet 6 inches	3rd	Returned to 1 inch	
	"	"	6 feet	4th	$2\frac{1}{8}$ inches below straight	
	"	"	6 feet 6 inches	5th	$4\frac{1}{8}$ inches below straight	
"	axle turned, 180°	6 feet 7 inches	1st	Returned to $2\frac{1}{4}$ inches		
"	"	7 feet	2nd	$\frac{1}{2}$ inch below straight		
"	"	7 feet 6 inches	3rd	$3\frac{3}{8}$ inches below straight		
"	"	8 feet	4th	$5\frac{1}{2}$ inches below straight		
"	"	7 feet 6 inches	5th	Broke after 2 foul blows		

Enclosure 2 in No. 4.

The STOREKEEPER, Public Works Department, to the ENGINEER-IN-CHIEF.

Public Works Office, Wellington, 10th June, 1884.

Re axles recently tested.

THESE have been delivered under two separate orders. The numbers supplied are as follows, viz. :—One thousand under order 16-83, of which those on the testing-sheets stamped "Staffordshire Wheel and Axle Company" form a part, and were supplied by the company bearing that name; and four hundred and ninety-four under Order 37-82, of which those stamped "Midland Iron Company" and "Lancaster Wagon Company" are a part, and were all supplied by the Lancaster Wagon Company.

The Engineer-in-Chief.

P. PUTNAM.

No. 5.

Minute by the UNDER-SECRETARY FOR PUBLIC WORKS, to the HON. THE MINISTER FOR PUBLIC WORKS.

I WOULD recommend that a copy of this report should be sent to the Agent-General, with an intimation that the broken axles would also be sent for the information of the Engineers in England; also, that the broken axles should be sent Home accordingly.

The Hon. the Minister for Public Works.

C. Y. O'CONNOR, 17/6/84.

No. 6.

The UNDER-SECRETARY FOR PUBLIC WORKS to the AGENT-GENERAL.

(Memorandum No. 25-84.)

Public Works Office, Wellington, 20th June, 1884.

I AM directed by the Minister for Public Works to enclose, for your information, copies of reports from the Engineer-in-Chief, and the Inspecting Engineer, relative to the testing of axles lately supplied by the Staffordshire Wheel and Axle Company, and the Lancaster Wagon Company, and to request that you will be good enough to call the attention of the Consulting Engineers thereto, in order that they may take such action as may be considered necessary under the circumstances of the case.

Instructions will be given to have the broken axles shipped to England by an early opportunity, in order that the Engineers may see them, and you will be duly advised when they are so shipped.

The Agent-General, London.

C. Y. O'CONNOR.

No. 7.

THE UNDER-SECRETARY FOR PUBLIC WORKS to the AGENT GENERAL.

(Memorandum No. 30-84.)

Public Works Office, Wellington, 22nd July, 1884.

IN pursuance of my memorandum, No. 25, of the 20th ult., I am now directed by the Minister for Public Works to enclose a bill of lading for six packages, containing wheels and axles, addressed to "The Agent-General for New Zealand, London."

The Agent-General, London.

C. Y. O'CONNOR.

No. 8.

The UNDER-SECRETARY FOR PUBLIC WORKS to the AGENT-GENERAL.

(Memorandum No. 31-84.)

Public Works Office, Wellington, 29th July, 1884.

REFERRING to my memorandum, No. 25-84, of the 20th ultimo, relative to the recent unsatisfactory tests of axles supplied by the Staffordshire Wheel and Axle Company, and the Lancaster Wagon Company, and especially to the copy of the report of the Engineer-in-Chief on this matter, which was enclosed therewith, I am now directed to inform you that the traffic requirements of the railways will not admit of our waiting until the companies mentioned can supply the whole of this order over again, and it has therefore been decided to at once proceed with the manufacture of a number of the axles in the Colony, and you are accordingly requested to limit your demands upon the companies, for axles of good quality to replace these inferior ones, to one-half of the total number supplied by each company, and to apply to them for a refund of the value of the other half.

The Agent-General, London.

C. Y. O'CONNOR.

No. 9.

The AGENT-GENERAL to the Hon. the PREMIER.

(Telegram)

London, 8th August, 1884.

AXLES sent ships "Victory," "Coptic," "Bebington," "Aorangi," dangerous. Use none without testing. Inform Manawatu Company.

The Premier, New Zealand.

F. D. BELL.

No. 10.

Minute by the GENERAL MANAGER OF RAILWAYS to the Hon. the MINISTER FOR PUBLIC WORKS. ARRANGEMENTS have been made for withdrawing the stock, and replacing the axles, as rapidly as possible.

The Hon. the Minister for Public Works.

J. P. MAXWELL, 25/8/84.

No. 11.

The AGENT-GENERAL to the HON. THE PREMIER.

(Telegram.)

London, 25th August, 1884.

ENGINEERS condemn axles made of scrap; recommend faggot bars. Instruct whether shall procure and ship immediately five hundred latter.

The Premier, New Zealand.

F. D. BELL.

No. 12.

The HON. THE PREMIER to the AGENT-GENERAL.

(Telegram.)

Wellington, 26th August, 1884.

AXLES—English Engineers responsible specification. Want thoroughly good axles.

The Agent-General, London.

R. STOUT.

No. 13.

The UNDER-SECRETARY FOR PUBLIC WORKS to the AGENT-GENERAL.

(Memorandum No. 34-84.)

Public Works Office, Wellington, 27th August 1884.

WITH reference to your cablegram of the 25th instant, I have the honor, by direction of the Minister for Public Works, to enclose copy of reply, marked "A," sent to you on the 26th instant, together with copy of the original draft of same marked "B," and to state that the latter more fully expresses what Hon. Mr. Richardson wished to say on the subject, but that it was cut down to save expense in transmission.

I am also to state that, as mentioned in Memorandum No. 25-84, of the 20th June last, it is requested that a number of axles, say 1,047, equivalent to half the number provided for under the contracts with the Lancaster Wagon Company, and the Staffordshire Wheel and Axle Company, dated respectively, December, 1882, and April, 1883, shall be procured and forwarded here as soon as convenient (if possible, at the cost of the contractors); and also that, if practicable, the value of the remaining half should be recovered from the contractors. Meantime we are making axles here as fast as possible, in order to prevent a deadlock in the traffic.

The Government has no objection to "faggot bars" being specified for, instead of "scrap iron faggotted," if the Consulting Engineers consider it advisable to do so.

The Agent-General, London.

C. Y. O'CONNOR.

Enclosure in No. 13.

The Hon. the PREMIER to the AGENT-GENERAL.

(Telegram.) A.

Wellington, 26th August, 1884.

AXLES.—English Engineers responsible specification. Want thoroughly good axles.

The Agent-General, London.

R. STOUT.

Enclosure 2 in No. 13.

(Draft of Telegram.) B.

Wellington, 26th August, 1884.

ENGINEERS here not responsible for the specification. That was left to Engineers in England, but we want thoroughly good wheels and axles, and such specification and supervision should be adopted as will ensure our getting them.

The Agent-General, London.

E. RICHARDSON.

No. 14.

The UNDER SECRETARY FOR PUBLIC WORKS to the AGENT-GENERAL.

(Memorandum No. 35-84.)

Public Works Office, Wellington, 6th September, 1884.

IN further reference to the defective railway axles, respecting which I have had the honor to address you on several occasions recently, I am now directed by the Minister for Public Works to forward to you the enclosed extract from a memorandum by the Locomotive Superintendent at Christchurch, in reference to an axle manufactured by the Midland Iron Company, and recently tested in the railway workshops there.

The small piece, which is referred to as having been broken off the axle, has been forwarded to you, per s.s. "Ionic," sailing this day, and the Minister would be glad if you will be good enough to bring this memorandum and sample under the notice of the Consulting Engineers.

The Agent-General, London.

C. Y. O'CONNOR.

Enclosure 1 in No. 14.

Extract from Locomotive Superintendent's Memorandum, dated 18th August, 1884, on subject of "Imported Axles and the Testing thereof."

* * * * * Maker—Midland Iron Company, Limited; test, standard—smashed first blow. Subsequently I sent one half of the broken axle into the blacksmiths' shop, and, placing it across an anvil, got a striker to knock off the above sample with an ordinary sledge hammer.

No. 15.

The UNDER-SECRETARY for PUBLIC WORKS to the AGENT-GENERAL.

(Memorandum, No. 36-84.) Public Works Office, Wellington, 25th September, 1884.

REFERRING to my memorandum, No. 31-84 of 29th July, informing you of the decision which had been come to by the Minister respecting the defective axles, I am now directed to request that you will be good enough to ship those requested to be obtained from the contractors (viz., half of the original order) to the undermentioned ports, namely—200 to Auckland, 500 to Wellington, and 347 to Lyttelton or Port Chalmers.

The Agent-General, London.

C. Y. O'CONNOR.

No. 16.

The AGENT-GENERAL to the HON. the MINISTER for PUBLIC WORKS.

(Memorandum, No. 79-84.) 7, Westminster Chambers, London, S.W., 12th August, 1884.

REFERRING to the Under-Secretary's memorandum, No. 25-84, of the 20th June, enclosing copies of reports relative to the testing of axles, I have to state that on its receipt I communicated with the Consulting Engineers on the subject, and instructed them to make immediate enquiry respecting the matter, and to report thereon, and Mr Carruthers has visited the works of the Staffordshire Wheel and Axle Company for that purpose.

Meanwhile a number of wheels and axles supplied by the same company, which were on the point of being shipped by the "Doric," have been kept back, and I have also directed all payments to the company in question to be stopped.

Having been informed by Mr Carruthers that the axles shipped in the s.s. "Victory" and "Coptic" (in March last), and in the "Aorangi" (in July), for the Manawatu Railway, and in the "Bebington" (in January last) for the New Zealand Government, were in all probability of inferior material, I deemed it right to send the Government a cablegram, copy of which I enclose herewith.

The Hon. the Minister for Public Works, Wellington.

WALTER KENNAWAY,

(For the Agent-General).

Enclosure in No. 16.

COPY of CABLEGRAM from AGENT-GENERAL, London, to the HON. the PREMIER, New Zealand.

London, 8th August, 1884.

AXLES sent ships "Victory," "Coptic," "Bebington," "Aorangi," dangerous. Use none without testing. Inform Manawatu Company.

The Premier, New Zealand.

F. D. BELL.

No. 17.

The AGENT-GENERAL to the HON. THE MINISTER FOR PUBLIC WORKS.

(Memorandum No. 89-84.) 7, Westminster Chambers, London, S.W., 18th September, 1884.

SINCE my memorandum of 12th August, No. 79, respecting the defective axles, the following circumstances have occurred.

On the 21st, the Consulting Engineers reported that, in their opinion, the untrustworthy method of making axles out of scrap iron ought to be discontinued, and advised that 500 axles should be ordered of faggotted iron, from the Patent Shaft and Axle-tree Company, for the Government, and 200 for the Manawatu Railway Company, (which had meanwhile directed its defective axles to be replaced.)

Thereupon I sent you the cablegram, of which copy is annexed, asking whether I should send these 500 axles, to which I received your reply on the 27th August, (copy also annexed.)

Although you do not, in that message, direct me to procure the axles, I have decided to do so, having regard to the great importance of the matter, and I have accordingly accepted a tender of the company in question, for the axles, at £1 19s.

Enclosed I beg to transmit copies of the Consulting Engineers' report above-mentioned, and of other papers relating to the matter.

The Hon. the Minister for Public Works, Wellington.

F. D. BELL.

Enclosure 1 in No. 17.

(Copy of Cablegram).

London, 25th August, 1884.

ENGINEERS condemn axles made of scrap, recommend faggotted bars, instruct whether shall procure and ship immediately 500 latter.

The Premier, New Zealand.

F. D. BELL.

Enclosure 2 in No. 17.

(Copy of Cablegram received.)

Wellington, 26th August, 1884.

AXLES—English Engineers responsible specification, want thoroughly good axles.

The Agent-General, London.

R. STOUT.

Enclosure 3 in No. 17.

The CONSULTING ENGINEERS, to the AGENT-GENERAL.

SIR,—

9, Great Queen Street, Westminster, S.W., 21st August, 1884.

In reference to the unfortunate matter of inferior axles which have been sent to New Zealand, we are of opinion that the untrustworthy method of constructing them out of scrap iron should be discontinued for the future, and that, pending the settlement of negotiations with the makers, which will almost certainly be tedious, it would be well to get a certain number, say 500, made by the Patent Shaft and Axletree Company, by their patented process of faggotted bars.

It will be seen from the analysis of tenders just received for fifty pairs of wheels and axles, ordered under Memorandum W.R./184, that the Patent Shaft Company's tender is the lowest, and we recommend that that company be invited to modify their tender by substituting their patent axles for the scrap axles called for in the specification; at the same time the company to be asked to submit a tender for 500 extra axles, to the same drawings and templates.

We enclose a specification of the new axles.

Our report on the defective axles is awaiting further information from the Lancaster Wagon Company, and the result of tests now being made by Professor Kennedy.

We have, &c.,

JOHN CARRUTHERS

(For Consulting Engineers).

The Agent-General for New Zealand, 7, Westminster Chambers, S.W.

No. 18.

The AGENT-GENERAL to the HON. the MINISTER for PUBLIC WORKS.

(Memorandum No. 101-84.) 7, Westminster Chambers, London, S.W., 17th, October 1884.

REFERRING to my memorandum, No. 89, of the 18th September, relating to the defective axles, I herewith transmit copies of correspondence which has taken place since that date respecting the matter.

In accordance with the instructions contained in the Under-Secretary's memorandum, No. 34-84, of the 27th August, I have ordered, of the Patent Shaft and Axletree Company, 547 axles, in addition to the 500 already contracted for by that company.

The Hon. the Minister for Public Works, Wellington.

F. D. BELL.

Enclosure in No. 18.

The CONSULTING ENGINEERS, to the AGENT-GENERAL.

SIR,—

9, Great Queen Street, Westminster, 15th October, 1884.

Re condemned axles. In explanation of our not having reported fully on the above, we beg to state that we have now sent to Professor Kennedy one-half of each of the axles sent from New Zealand, so that he may report thereon. The other halves of the axles we have had rolled into bars, samples of which have also been sent to Professor Kennedy. As soon as the tests have been made, we will report to you.

We have, &c.,

JOHN CARRUTHERS

(For Consulting Engineers).

The Agent-General, London.

No. 19.

The AGENT-GENERAL to the HON. the MINISTER for PUBLIC WORKS.

SIR,—

7, Westminster Chambers, London, S.W., 12th November, 1884.

The letters which I have recently sent you on the subject of the defective axles will have kept you informed of what has hitherto been done here. I now transmit copy of a report I have received from the Consulting Engineers, containing an account of the tests to which samples of the axles had been submitted under Professor Kennedy.

I trust you will be pleased to inform me of the view you take of the Engineers' explanations, and of the course they recommend. The most important point seems to be their proposal to abandon altogether in future the use of hammer-worked scrap, and adopt the more reliable, though costlier, material of rolled bars, welded under the hammer.

I propose to recover from the Lancaster Wagon Company, as recommended by the Engineers, 30s. each upon all the axles made by the Midland Iron Company; and from the Staffordshire Wheel and Axle Company, the whole price of 30s each.

The sample which you sent Home by the s.s. "Ionic," as mentioned in your memorandum of

6th September, No. 35, was only received on the 8th instant, and there has of course not been time to test it. The orders as to distribution of the 1047 axles, contained in your memorandum of 25th September, No. 36, will be duly carried out.

The Hon. the Minister for Public Works, Wellington.

I have, &c.,

F. D. BELL.

Enclosure 1 in No. 19.

The CONSULTING ENGINEERS to the AGENT-GENERAL.

SIR,—

9, Great Queen Street, Westminster, S.W., 11th November, 1884.

RE *Defective Axles.*

In reference to the various letters received from you on the above subject, we beg to report as follows:—

As we have already informed you, the delay in our report has arisen from our wish to see the broken axles, and to have them submitted to proper tests, before writing on the subject. This has now been done, and we have received from Professor Kennedy the enclosed analyses of the several tests he has made.

We will reply, first, to the question contained in your letter of the 25th August, as to “how the testing and inspection was conducted?”

At Lancaster we had an Inspector, Mr. Harcourt, resident in the town, and engaged solely in overlooking work going on at the works of the Lancaster Wagon Company. Mr. Harcourt is an experienced man, who has inspected a great many of the locomotives now in New Zealand, as he was our Resident Inspector at Bristol until the stoppage of the Avonside Locomotive Works.

Many of the axles were forged under his inspection; but as he resigned his position in order to start as an engineer, in London, on his own account, the forging of the remainder, and the turning of nearly all, were entrusted to another Inspector, Mr. Lane, who also was engaged solely on work going on at the Lancaster Company's works. There is not the slightest doubt that the axles supplied by this company were duly tested under the drop.

The axles made by the Staffordshire Wheel and Axle Company were inspected by Mr. Austin, our oldest Inspector, who has been engaged in overlooking the work for New Zealand in Birmingham since the very beginning.

Mr. Austin certainly had some other work, although not much, to attend to in and near Birmingham, but the Staffordshire Company's works are near his house, and he saw the axles made from beginning to end.

The scrap used, both in Birmingham and Lancaster, was closely looked after, and was always of superior quality, being, for the most part, the cross ends of Staffordshire bars, and filled in with bolts and rivets; and on first discovering that some of the axles made by the Staffordshire Company were bad, we suspected that trickery had been employed, by which inferior scrap, not taken from the scrap heap, had been substituted. We therefore sent pieces of three axles which had failed, to a rolling-mill, where they were rolled down into bars $1\frac{1}{2}$ inches square, and proved to be not only good, but exceedingly good iron, equal to best Staffordshire.

In order to test in the same manner the samples received from New Zealand, we had the boxes sent to Birmingham, where the writer stamped each piece. One-half of each axle was sent direct to Professor Kennedy, the other halves being taken to the Patent Nut and Bolt Company, when, in the presence of the writer, they were rolled into $1\frac{1}{2}$ -inch square bars; pieces from these bars were again rolled into $\frac{1}{2}$ inch bars, and the pieces, being all properly stamped, were sent to Professor Kennedy for experiment.

The tests made by Professor Kennedy show that in all cases the iron used was excellent, the average breaking load of the $\frac{1}{2}$ -inch bars being 25.9 tons per square inch, with a reduction of area of 40 per cent., the *minima* and *maxima* being 23.97 and 27.94 tons per square inch for breaking-load, and 21.9 and 49.9 per cent. for reduction. These results are equal to best Yorkshire iron, showing the defect in the axles to have been one of workmanship, and not of material.

The crystalline nature of the fracture of the axles, and of the $1\frac{1}{2}$ -inch bars, shows that the iron has been, in many cases, taken too hot from the furnace, and occasionally, as in the axle marked “A.” which broke on the ship, has been burnt. This is a fault to which scrap-axles are very liable, as hammermen in England are paid by the piece, and will always (when possible) make their work easy by over-heating the iron.

It is also a fault which may readily escape detection, as, of course, only a part of the axles will be defective. For instance, out of one lot of thirty axles tested by the writer at the works of the Staffordshire Company, the first happened to have been bad, and the lot was condemned; but on further tests having been made, several of the axles were found to be so good that they could not be broken under the drop, and when put under the hydraulic press, bent until the ends met. Had one of these happened to come first to hand, the lot would have been passed, although many of them were bad.

The same irregularity in the workmanship is apparent in the axles of other makers, as tested in New Zealand; and this is evident also in those made in Dunedin, one of the two tested requiring nearly twice as much stress to break it as the other.

This irregularity is more or less inherent in hammer-worked scrap, and we propose in future to abandon its use, adopting the more costly, but more trustworthy, method of constructing the axles of rolled bars welded under the hammer.

In examining the tests of the axles made by the Lancaster Company, it will be seen that the iron, even before being rolled, is of superior quality, and has been sufficiently worked under the hammer, as is evidenced by the silky fracture. We do not think there is the least danger in using

these axles, or, at least, that further testing should be made before they are condemned. All we have broken at these works have been so good that we cannot but think that the two which just failed to meet the test are exceptional, and even these so nearly stood it that they are quite trustworthy for use.

We do not deny that our Inspector at Birmingham committed a gross error in trusting so much as he did to the quality of the scrap, and not testing under the drop as many axles as he ought to have done. He did, however, test several, and the writer saw some of his tests, in which the ends of the axles were brought nearly to meeting. Our confidence in Mr. Austin was so great, that we did not (as far as we remember) test personally any of the last ordered, except those above alluded to, when the writer found several bad axles.

In regard to the Lancaster axles, we are convinced that the tests were made, and that the Inspector did not light upon one inferior axle; and this has also been our own experience at these works, whose position in the trade stands very high.

In conclusion we can only regret the occurrence, the gravity of which we certainly do not underestimate.

In regard to recovering the cost of the axles sent out, we think there will be no difficulty in recovering from the Lancaster Company the value at, say, 30s. each, of all axles made by the Midland Company, the number of which can be learnt from their books, and checked in the Colony.

Should further trial lead to the condemnation of those made in their own works, the company might then be called upon to pay the price.

In regard to the Staffordshire Company, we certainly think they should be called upon to pay the whole price of the axles at 30s. each.

The iron used in these axles is inherently so good that it may be used in the Colony as scrap for almost any purpose; and the makers ought, of course, to get an allowance at local rates, if the iron can be put to use.

We recommend that the faggotted bar axles now being sent out should be put under the passenger stock, which should generally be supplied with this class of axle.

We have, &c.,

JOHN CARRUTHERS

(For Consulting Engineers).

The Agent-General for New Zealand, London.

Enclosure 1 in 1 of No. 19.

MARKS ON HALF-AXLES and on IRON BARS rolled from same.

Letter used in report of C. B. Knorpp of 9th June, 1884.	Mark attached to corresponding half axle tested as received.	Mark attached to 1 1/2 in. square bars rolled from half-axle.	Mark attached to 1/2 in. square bars rolled from same half-axle.	
A.	J.C. J.C. X J.C. S.A. J.C.	S.X.	K.A. A.	From Staffordshire W. & A. Co.,
B.	" S.B.	S.Z.	" B.	do
C.	" S.C.	S.C.	" C.	do
D.	" S.D.	S.D.G.	" D.	do
E.	" S.E.	S.E.	" E.	do
F.	" M.F.	M.L.	" F.	From Midland Iron Co.
G.	" M.G.	M.G.	" G.	do
H.	" M.H.	M.H.	" H.	do
I.	" L.I.	L.I.	" I.	From Lancaster Wagon Co.
J.	" L.J.	L.J.	" J.	do
K.	" L.K.	L.K.	" K.	do

Enclosure 2 in 1 of No. 19.

REPORT on TENSILE TESTS of ELEVEN PIECES of AXLES received from MESSRS. the BEUTHER'S PATENT RAILWAY AXLE-BOX COMPANY.

Received, October 13. Tested, October 21st and 22nd.

Engineering Laboratory, University College, London, W.C., 22nd October, 1884.

U. C. L. Test Number.	Marks on Piece.	Dimensions.		Limit of Elasticity.		Breaking Load.		Ratio of Li mit to Break	Exten sion on whole lengths of 3 Inches. per cent.	Reduction of Area at Fracture. per cent.	Remarks.
		Breadth. Inches.	Thickness. Inches.	Area. Square Inches.	Pounds per Square Inch.	Tons per Square Inch.	Pounds per Square Inch.				
7,571	J.C. A. J.C. X J.C.	Staffordshire. ·561 inches diameter.		·247	32,530	14·52	46,480	·700	10·0	11·1	Fracture entirely, and very coarsely, crystalline ; surface a good deal distressed.
7,572	J.C. B. " S.	Staffordshire. ·562 inches diameter.		·248	33,350	14·89	48,170	·692	14·0	16·0	Irregular, silky, specked with crystal ; surface much distressed.
7,573	J.C. C. " S.	Staffordshire. ·561 inches diameter.		·247	37,420	16·70	46,010	·813	5·0	4·6	Entirely, and very coarsely, crystalline.
7,574	J.C. D. " S.	Staffordshire. ·562 inches diameter.		·248	31,280	13·96	47,400	·660	19·0	20·8	Irregular, silky, welding imperfect, about 8 per cent. coarsely crystalline, surface much distressed.
7,575	J.C. E. " S.	Staffordshire. ·562 inches diameter.		·248	37,080	16·55	54,820	·676	18·7	18·6	Coarsely crystalline throughout, surface very much distressed.
7,576	J.C. F. " M.	Midland. ·562 inches diameter.		·248	36,840	16·45	54,740	·673	23·3	28·9	75 per cent. coarsely crystalline, the rest silky ; surface very much distressed.
7,577	J.C. G. " M.	Midland. ·561 inches diameter.		·247	33,660	15·03	56,880	·592	11·7	14·1	95 per cent. somewhat finely crystalline, surface very little distressed.
7,578	J.C. H. " M.	Midland. ·561 inches diameter.		·247	36,410	16·25	54,930	·663	13·0	20·5	90 per cent coarsely crystalline, surface much distressed.
7,579	J.C. I. " L.	Lancaster. ·561 inches diameter.		·247	37,790	16·87	56,710	·667	16·3	30·7	Silky, with a cinder flaw ; surface ready.
7,580	J.C. J. " L.	Lancaster. ·561 inches diameter.		·247	38,840	17·34	51,210	·758	13·7	30·1	Silky, surface very little distressed.
7,581	J.C. K. " L.	Lancaster. ·560 inches diameter.		·246	37,760	16·86	53,270	·709	18·0	25·0	Silky, specks of crystal, surface a good deal distressed.

J. Carruthers, Esq., 9, Great Queen Street, Westminster, S.W.

ALEX. B. W. KENNEDY.

Enclosure 3 in 1 of No. 19.

REPORT ON TENSILE TESTS OF FORTY-FOUR WROUGHT-IRON BARS, ROLLED FROM HALVES OF AXLES, TWENTY-TWO 1½-IN. SQUARE, AND TWENTY-TWO ½-IN. SQUARE. Received from Messrs. the Patent Nut and Bolt Company. Received, October 15th; Tested, October 16th, 24th and 26th.

Engineering Laboratory, University College, London, W.C., 25th October, 1884.

U.C.L. Test Number.	Marks on Piece.	Dimensions.		Limit of Elasticity.		Breaking Load.		Ratio of Limit to Break.	Extension on whole length of 10 inches.	Reduction of Area at Fracture.	Extension on 3 inches at Fracture.	Remarks.
		Breadth	Thickness.	Area.	Pounds.	Tons.	Pounds.					
		INCH-AND-A-HALF BARS		Sq. in.	Per sq. in.	Per sq. in.	Per sq. in.		Per cent.	Per cent.		
7,585	S.X.	1.055 inches diameter	.874	36,666	16.37	57,080	25.48	.626	22.9	34.3	36.0	Silky, some lamination, about 40 per cent. crystalline.
7,586	S.X.	1.058 inches diameter	.879	35,546	15.87	55,220	24.95	.664	14.0	23.4	19.0	Irregular, 75 per cent. crystalline, welding a little defective.
7,588	S.Z.	1.058 inches diameter	.879	33,840	15.11	54,650	24.40	.619	21.6	40.2	33.0	25 per cent. crystalline, and granular in patches, the rest chiefly silky.
7,589	S.Z.	1.058 inches diameter	.879	35,540	15.87	54,310	24.25	.654	24.0	33.9	33.3	45 per cent. crystalline, and granular in patches, the rest chiefly silky.
7,591	S.C.	1.046 inches diameter	.859	31,770	14.18	53,290	23.79	.596	22.3	35.8	31.3	About 40 per cent. crystalline in patches, the rest silky, somewhat spongy in structure.
7,592	S.C.	1.043 inches diameter	.854	32,890	14.68	54,420	24.30	.604	21.1	34.4	30.0	Irregular, 70 per cent. crystalline, some reediness.
7,594	S.D.G.	1.050 inches diameter	.866	34,120	15.23	56,000	25.00	.609	23.1	30.9	29.0	35 per cent. crystalline.
7,595	S.D.G.	1.042 inches diameter	.853	33,300	14.87	55,580	24.81	.599	23.8	31.9	31.3	40 per cent. crystalline, welding a little defective.
7,597	S.E.	1.057 inches diameter	.877	33,680	15.04	54,530	24.34	.618	13.5	21.9	19.3	90 per cent. somewhat coarsely crystalline, cinder flaw in centre and on surface.
7,598	S.E.	1.044 inches diameter	.856	36,510	16.30	57,480	25.66	.635	26.4	36.9	36.7	55 per cent. crystalline, a little cinder.
7,600	M.L.	1.052 inches diameter	.869	36,880	16.46	57,870	25.33	.637	25.7	42.6	39.3	About 50 per cent. crystalline, the rest silky.
7,601	M.L.	1.050 inches diameter	.866	35,450	15.83	57,450	25.65	.617	26.0	42.4	36.7	About 50 per cent. crystalline, the rest silky.
7,603	M.G.	1.050 inches diameter	.866	34,640	15.47	53,690	23.97	.645	23.2	40.9	36.0	25 per cent. crystalline in patches, the rest silky.
7,604	M.G.	1.057 inches diameter	.877	33,510	14.96	54,480	24.32	.615	18.1	18.3	16.7	95 per cent. crystalline.
7,606	M.H.	1.045 inches diameter	.858	37,900	16.92	60,590	27.05	.626	15.0	15.2	17.0	Crystalline throughout.
7,607	M.H.	1.050 inches diameter	.866	33,720	15.05	60,210	26.88	.560	17.0	17.3	18.7	Crystalline throughout.
7,609	L.I.	1.056 inches diameter	.876	29,590	13.21	51,850	23.15	.571	25.0	39.4	35.7	Silky, a slight cinder flaw in centre.
7,610	L.I.	1.043 inches diameter	.873	30,940	13.81	51,700	23.08	.598	25.8	40.2	38.7	Silky, a slight cinder flaw in centre.
7,612	L.J.	1.056 inches diameter	.876	29,980	13.38	51,040	22.79	.587	24.0	39.0	36.0	Silky, a slight cinder flaw in centre.
7,613	L.J.	1.040 inches diameter	.850	32,200	14.38	52,110	23.26	.618	27.7	41.7	37.0	Silky.
7,615	L.K.	1.058 inches diameter	.879	31,160	13.91	53,340	23.81	.584	22.3	39.5	35.7	About 5 per cent. finely crystalline, the rest silky.
7,616	L.K.	1.045 inches diameter	.858	26,240	11.71	53,470	23.88	.491	23.9	38.4	37.3	Silky, specks of crystal.

* At fracture.

† At smallest section.

REPORT ON TENSILE TESTS OF FORTY-FOUR WROUGHT IRON BARS—continued.

U. C. L. Test Number.	Marks on Piece.	Dimensions.		Limit of Elasticity.		Breaking Load.		Ratio of Limit to Break	Extension on 10 Inches.	Reduction of Area at Fracture.	Extension on 3 Inches at Fracture.	Remarks.
		Breadth.	Thickness.	Pounds.	Tons.	Pounds.	Tons.					
7,618	K. A. A.	HALF-INCH BARS.		Per sq. in.	Per sq. in.	Per sq. in.	Per sq. in.	Per cent.	Per cent.	Per cent.		
		.480 in.	.485 in.	36,510	16.30	57,450	25.65	.636	22.0	43.6	29.7	Silky, about 8 per cent. finely crystalline.
		(Tested as received.)										
7,619	" B.	.443 in.	Diameter.	41,140	18.36	60,740	27.11	.677	19.6	41.1	26.7	Silky, about 10 per cent. crystalline.
7,620	" "	.441 in.	Diameter.	41,630	18.58	58,770	26.23	.708	21.9	44.0	29.7	Silky, specks of crystal.
7,621	" "	.485 in.	.481 in.	38,040	16.98	57,340	25.60	.663	23.7	46.8	33.3	Silky.
		(Tested as received.)										
7,622	" C.	.447 in.	Diameter.	40,030	17.87	59,270	26.46	.675	20.3	39.4	23.3	Silky, specked with crystal.
7,623	" "	.481 in.	.481 in.	39,260	17.52	57,800	25.80	.679	18.5	30.7	23.3	Silky, slightly reedy; broke just at Inspector's stamp.
		(Tested as received.)										
7,624	" D.	.447 in.	Diameter.	40,150	17.92	60,290	26.91	.666	19.8	42.1	28.0	Silky.
7,625	" "	.477 in.	.481 in.	36,180	16.15	60,050	26.81	.602	24.1	45.1	32.0	Silky.
		(Tested as received.)										
7,626	" E.	.445 in.	Diameter.	40,400	18.04	61,350	27.39	.659	19.0	38.8	24.7	Silky, about 8 per cent. crystalline.
7,627	" "	.481 in.	.480 in.	40,820	18.22	59,120	26.39	.690	21.2	34.8	23.7	Silky, about 15 per cent. crystalline.
		(Tested as received.)										
7,628	" F.	.445 in.	Diameter.	41,800	18.66	58,400	26.07	.716	17.9	41.6	24.0	Silky, specked with crystal.
7,629	" "	.482 in.	.481 in.	39,350	17.57	58,750	26.23	.670	23.8	38.4	29.3	Silky.
		(Tested as received.)										
7,630	" G.	.443 in.	Diameter.	37,430	16.71	55,590	25.26	.661	21.5	49.9	27.7	Silky.
7,631	" "	.485 in.	.483 in.	38,730	17.29	55,910	24.96	.693	25.1	46.2	32.7	Silky.
		(Tested as received.)										
7,632	" H.	.447 in.	Diameter.	45,640	20.37	62,600	27.94	.729	21.9	47.2	30.0	Silky.
7,633	" "	.483 in.	.481 in.	42,300	18.88	61,020	27.24	.693	19.1	42.4	25.0	Silky, a surface-blister on one side.
		(Tested as received.)										
7,634	" I.	.480 in.	.485 in.	36,510	16.30	55,700	25.97	.680	13.3	23.5	15.7	Silky, a little reedy; broke across Inspector's stamp.
		(Tested as received.)										
7,635	" "	.443 in.	Diameter.	40,240	17.96	56,330	25.15	.714	17.7	35.4	23.3	Silky, a blister on surface.
7,636	K. A. J.	.447 in.	Diameter.	40,280	17.98	55,460	24.76	.726	20.1	40.1	26.0	Silky.
7,637	" "	.486 in.	.486 in.	35,110	15.67	54,630	24.39	.642	16.2	21.9	17.7	Silky, slightly reedy.
		(Tested as received.)										
7,638	" K.	.447 in.	Diameter.	38,750	17.30	56,470	25.21	.686	18.8	42.1	25.7	Silky.
7,639	" "	.482 in.	.484 in.	37,400	16.70	54,760	24.45	.683	23.9	44.1	30.0	Silky.
		(Tested as received.)										

J. Carruthers, Esq., 9, Great Queen Street, Westminster, S.W.

ALEX. B. W. KENNEDY.

No. 20.

The HON. the PREMIER to the AGENT-GENERAL.

(Extract from Telegram.)

Wellington, 12th January, 1885.

* * * * * Have you recovered value condemned axles?
 The Agent-General, London. R. STOUT.

No. 21.

THE AGENT-GENERAL to the HON. the PREMIER.

(Extract from Telegram.)

London, 14th January, 1885.

* * * * * Condemned axles, value not recovered. Detaining balances; shall
 probably have to bring action.
 The Premier, New Zealand F. D. BELL.

No. 22.

Memorandum by the UNDER-SECRETARY FOR PUBLIC WORKS to the ENGINEER-IN-CHIEF.

Do you wish to make any remarks on the Agent-General's letter of 12th November last, and its enclosures?

The Engineer-in-Chief.

C. Y. O'CONNOR, 14/1/85.

Minute by the Engineer-in-Chief.

ONLY this, that notwithstanding the explanations of the Consulting Engineers, I do not yet think that the axles were tested as it was specified they should have been. Also that the testing by Professor Kennedy is quite outside the question, as it only shows what could be made of certain pieces of axles by forging down and rolling into small sizes. What we are concerned with is the quality of the iron as axles, and this has been proved to be bad, and of the worst description.

The Under-Secretary for Public Works.

JOHN BLACKETT 16/1/85.

No. 23.

Memorandum by the UNDER-SECRETARY FOR PUBLIC WORKS to the GENERAL MANAGER of RAILWAYS.
 Do you wish to make any remarks on the Agent-General's letter of 12th November last, and its enclosures?

The General Manager of Railways.

C. Y. O'CONNOR, 17/1/85.

Minute by the General Manager of Railways.

A large number of these axles have been tested in Christchurch and Dunedin, as well as in Wellington, and they have all failed utterly. New axles forged from the broken pieces also failed. New axles forged from good scrap, tested at the same time, stood the tests, and would not break with more than a dozen blows. Old axles from former importations, tested at the same time, bore the test thoroughly.

There seems scarcely room to doubt that the importations referred to are thoroughly bad.

The Under-Secretary for Public Works.

J. P. MAXWELL, 29/1/85.

No. 24.

The UNDER-SECRETARY FOR PUBLIC WORKS to the AGENT-GENERAL.

(Memorandum No. 11/85.)

Public Works Office, Wellington, 11th February, 1885.

IN reference to former memoranda, which I have had the honor to address to you, on the subject of the defective axles supplied under the contracts with the Lancaster Wagon Company, and the Staffordshire Wheel and Axle Company, and especially to your memorandum No. 517 of the 12th November last, covering a report from the Consulting Engineers on the matter, I am now directed by the Minister for Public Works to inform you that he is advised that a large number of these axles have been tested in the railway workshops at Christchurch and Dunedin, as well as in Wellington, and that all have failed utterly, and that some new axles that were forged in the same workshops, from pieces of the imported ones that had been broken in testing, failed similarly. Some other axles that were also forged in the shops, from good scrap iron, and tested at the same time, stood the tests well, and could not be broken even after receiving more than a dozen blows; and some old axles, taken from former importations, and also tested at the same time, bore the test well.

The Agent-General, London

C. Y. O'CONNOR.

No. 25.

THE AGENT-GENERAL to the HON. the MINISTER FOR PUBLIC WORKS.

SIR,—

7, Westminster Chambers, London, S.W. 20th January, 1885.

I duly received your telegram of the 12th instant, on the subject of the condemned axles, and in

reference thereto, I have to inform you that I have not yet been able to recover their value, notwithstanding repeated applications.

In the case of the Lancaster Wagon Company, however, a sum of £514, payable to them under their contract (Memorandum 8/84 of 13th February 1884), has been detained by me; and, in the case of the Staffordshire Wheel and Axle Company, there is £691 still due to them on account of contracts for the supply of wheels and axles for the Wellington and Manawatu Railway, and this amount has also been detained.

* * * * *

The Hon. the Minister for Public Works, Wellington.

I have, &c.,
F. D. BELL.

Enclosures in No. 25.

Extract from Cablegram received 12th January, 1885.

* * * * * Have you recovered value condemned axles.
The Agent-General, London. R. STOUT.

Extract from Cablegram despatched 14th January, 1885.

* * * * * Condemned axles, value not recovered. Detaining
balances; shall probably have to bring action.
The Premier, New Zealand. F. D. BELL.

No. 26.

THE GENERAL MANAGER OF RAILWAYS to the Hon. the MINISTER FOR PUBLIC WORKS.

THE making of wheels and axles can now be done in the Colony, and it might be as well to apprise the Agent-General that, in consequence of their failures, and the indifferent work and material found in the wagon and carriage ironwork recently imported, it has been decided to import no more from England.

The Hon. the Minister for Public Works.

J. P. MAXWELL, 20/3/85.

No. 27.

THE HON. MINISTER for PUBLIC WORKS to the AGENT-GENERAL.

Public Works Office, Wellington, N.Z., 21st March, 1885.

SIR,—

I have now the honor to acknowledge the receipt of your letter of the 20th January, on the subject of the condemned axles, and have only now to express a hope that Messrs Mackrell & Co. may find a way of inducing the manufacturers to pay the claim you have made against them.

The great loss the Government has been put to in connection with these wheels and axles (for we find a large number of the wheels are also defective) with wagon ironwork, and lastly, in connection with the locomotives, has compelled me to take into the most serious consideration, the question of inspection in England, and I shall address you by a subsequent mail on this subject.

In the meantime, I am taking steps to so increase our appliances, as to obviate the necessity of ordering from England many articles, such as those above referred to, as independently of the encouragement we are thereby giving to local industries, we prefer to know that we have good articles, and at the same time also to know what we have to pay for them.

I shall only now add, that I have personally witnessed the testing of many of the wheels and axles, and I have no hesitation in saying, that if there was any inspection at all, it must have been of the most perfunctory nature, and worse than useless, as when these wheels and axles first arrived, believing that they had been inspected, we commenced to use them, and it is little short of a miracle that no serious accident has happened thereby. In some instances the first blow given in process of testing, caused the axle to break in three pieces, the turned bearings actually dropping off from the jar of the blow given in the centre. You will be glad to hear that we are now forging in the Colony, from scrap-iron, wheels and axles, both by contract, and in the Government workshops, with complete success, and shall therefore order no more of them from England.

The Agent-General, London.

I have, &c.,
EDWARD RICHARDSON.

No. 28.

Memorandum by the GENERAL MANAGER of RAILWAYS to the Hon. the MINISTER for PUBLIC WORKS.

Defective Axles.

SINCE expressing an opinion on this matter, on the 29th January last, I have had a further lot of axles, of different makers, selected, and the tests, according to the specification, carefully recorded and tabulated. The results are indicated in the attached returns. The two series of tests were carried out under separate observers.

These experiments confirm the opinion that the whole of the importations referred to must be condemned.

The Hon. the Minister for Public Works.

J. P. MAXWELL, 1/5/85.

Enclosure 1 in No. 28.

NEW ZEALAND RAILWAYS.

HURUNUI-BLUFF SECTION.

Result of Test of 82 Wagon Axles of various makers, at the Addington Workshops.

Weight of test—one ton. Height of Drop—three feet. Centre of Axles—three feet six inches.

Name of Maker.	Number of Axles Tested	Number broken at first blow.	Number broken at second blow.	Number broken at third blow.	Number broken at fourth blow.	Number broken at fifth blow.	Remarks.
Lancaster Wagon Company	30	1	0	1	4	0	24 sustained 5 blows without fracture
Staffordshire Wheel and Axle Company	26	17	5	2	2	0	None sustained 4 blows without fracture
Midland Iron Company, Warrington	26	5	3	5	1	2	Two cracked at fifth blow, and 8 sustained five blows without fracture
Totals ...	82	23	8	8	7	2	

The test provided for in the contract specification was as follows, viz.:—The axles will be subjected to the following test—Bearings 3 feet 6 inches, to receive three blows from a ton falling three feet; then reversed and receive two similar blows without breaking.

April 24th, 1885.

Enclosure 2 in No. 28.

NEW ZEALAND RAILWAYS.

HURUNUI-BLUFF SECTION.

Result of Test of 69 Wagon Axles of various makers, at the Hillside Workshops.

Weight of Test—One ton. Height of Drop—three feet. Centre of axles—three feet six inches.

Name of Maker.	Number of Axles Tested.	Number broken at first blow.	Number broken at second blow.	Number broken at third blow.	Number broken at fourth blow.	Number broken at fifth blow.	Remarks.
Lancaster Wagon Company	23	0	1	0	3	5	14 sustained 5 blows without fracture
Staffordshire Wheel and Axle Company	23	7	8	4	3	0	One sustained 5 blows without fracture
Midland Iron Company, Warrington	23	4	2	3	4	4	Six sustained 5 blows without fracture
Totals ...	69	11	11	7	10	9	

The test provided for in the contract specification was as follows, viz.:—The axles will be subjected to the following test—Bearings three feet six inches, to receive three blows from a ton falling three feet; then reversed and receive two similar blows without breaking.

April 25th, 1885

No. 29.

The AGENT-GENERAL to the Hon. the MINISTER FOR PUBLIC WORKS.

SIR,—

7, Westminster Chambers, London, S.W., 22nd April, 1885.

I beg to report the further steps which I have taken in the claims of the Government on the Lancaster Wagon Company, and the Staffordshire Wheel and Axle Company, for defective axles, since my letter of the 20th January.

On the 21st January, I referred the papers to Messrs Mackrell & Co., for advice as to what could be done if the Government claims were not settled soon.

On the 17th February, the Lancaster Wagon Co. sent in a fresh request for the payment of their £514 balance, but were again informed of our counter-claims, and on the 26th February the same company informed me that they had not been able to arrange with the Midland Iron Company (who were the makers of the defective axles) for any allowance, and pointed out that their claim for other wheels and axles was wholly unconnected with this transaction. Both companies go on repeating their claims at intervals.

On the sixth March, Messrs Mackrell advised that as the questions involved were like those in the case of Messrs Nasmyth, Wilson & Co.'s locomotive engines, they had purposely refrained from sending in any report, until the engines question had been settled.

On the 27th March, I received your memorandum of the 11th February, No. 11, to the effect that a large number of the defective axles had been tested in the railway workshops at Christchurch and Dunedin, as well as at Wellington, and that all had completely failed. * * *
 * * * I propose, unless otherwise ordered by you, to go on refusing to pay the amounts claimed for axles, and let the companies bring an action if they choose.

The Hon. the Minister for Public Works, Wellington.

I have, &c.,
 F. D. BELL.

No. 30.

THE AGENT-GENERAL to the HON. the MINISTER FOR PUBLIC WORKS.

SIR,—

7, Westminster Chambers, London, S.W., 16th May, 1885.

It was with great satisfaction that I received your letter of the 21st March, stating that you had had under your serious consideration the question of inspection of Railway Material in England; and I shall be most glad to learn the decision to which you may have come. For a long time past I have had cause to be dissatisfied with the existing system; but the tremendous danger that was run by the shipment of axles which had been passed as sound, but were in reality worthless, turned that dissatisfaction into such a different feeling, that I had already come to the conclusion that nothing but a radical change would do any good.

I am much obliged for the welcome information you are pleased to give me in your letter, that you are having wheels and axles forged in the Colony, and would not order more from England.

The Hon. the Minister for Public Works, Wellington.

I have &c.,
 F. D. BELL.

No. 31.

THE HON. the MINISTER FOR PUBLIC WORKS to the AGENT-GENERAL.

Public Works Office, Wellington, 17th July, 1885.

Re Inspection of Railway Material in England.

(Memorandum No. 39/85.)

I have the honor to acknowledge the receipt of your letter of 16th May, No. 615, on the above subject, and in reply I beg to thank you for the attention which, from the tenor of your letter, it is evident you have given to this subject, and to inform you that the Government intends, immediately after the conclusion of the present Session, to take into its most serious consideration the whole question of the inspection of Government Material in England, and I will then have the honor of writing you further on the subject, and shall be glad to receive any suggestions you may like to make by return of post.

The Agent-General, London.

EDWARD RICHARDSON.

