

Building controls in New Zealand: A brief history, 1870 to the 1930s

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ABSTRACT: From the earliest European settlement in the 1840s to the current day, New Zealand has had a range of building controls. Initially, provincial government legislation covered only larger population centres, but following passage of the Municipal Corporations Act 1867, local authorities could make their own by-laws. Subsequent revisions increased by-law coverage. By 1923, at least 37 towns, boroughs and cities had their own (often different) building by-laws, but it was not until the 1931 Napier, NZ, earthquake that the 1935 national "Standard Model Building By-law" NZSS 95, complete with seismic requirements, was created. This paper reviews the evolution of building by-laws in two major cities – Dunedin and Wellington – from 1876 to the 1930s. It explores the issues and materials controlled in each major change in the by-laws as well as the reasons for change. By comparing the requirements between the two cities over time, it explores how these represent changes in construction systems, methods and materials as well as responses to different natural and man-made disasters.

1 INTRODUCTION

Traditional societies, including the Maori of Aotearoa/New Zealand (NZ), have long had customary rules around the construction and use of buildings. For example, during the English Captain James Cook's first voyage of discovery, the naturalist Joseph Banks recorded on 21 October 1769: "Every House or small knot of 3 or 4 has a regular necessary house where everyone repairs and consequently the neighbourhood is kept clean" (Beaglehole 1962). European colonization led to ever increasing controls for a variety of building types.

The 1840 signing of the Treaty of Waitangi between the English Crown (Queen Victoria) and the indigenous Maori led to increasing European immigration. Once their houses were built, the first national building control was to limit flammable construction – The Raupo Houses Ordinance 1842 (raupo is a swamp reed similar to the bullrush). As towns grew, fire resistant construction (brick, stone, and later concrete) was also promoted by controls. Although initially seismic dangers were not well understood, major earthquakes in 1855, 1869, 1870, 1888, etc. helped the new settlers understand the dangers of living on lively ground (Isaacs 2012).

Local councils of large cities initially relied on Provincial or Central Government legislation as a basis for building controls. By 1867, the cities of Auckland, Dunedin and Christchurch had building controls under provincial legislation covering issues such as structure, fire, chimneys, roofs, verandas, and street front projections, as well as dangerous buildings and the ability to require an inspection fee to ensure compliance (and penalties in case of non-compliance). Nevertheless, Dunedin's Otago Daily Times reported on 18 April

1863: "much still remains to be due in order to transmute these flimsy and perilous structures into more permanent and secure edifices of brick and stone" (Isaacs 2012).

1.1 *Authorization for local government*

The Municipal Corporations Act 1867 allowed local government (councils) to have by-laws to regulate buildings (13th Schedule, Part V), including:

- (a) to prohibit or restrain use of combustible or dangerous materials;
- (b) the distance between buildings;
- (c) wall dimensions & materials;
- (d) fireplace & chimney construction & materials;
- (e) erection of temporary structures (e.g. tents);
- (f) time for the use of non-complying building, roof, fireplace, furnace, or chimney;
- (g) to set fees "not exceeding £2 in each case, for any inspection, superintendence, or other service performed by the Borough Surveyor or other officer of the Council" (£2 in 1876 ≈ €190 in 2020).

The Act permitted the replacement of 19 different laws for the management of just 20 incorporated towns (NZ Parliament., vol. 1, pt 1 2 Aug 1867) This coverage was continued and extended by the Municipal Corporations Act 1876 (Part XI, Section 349(5)). This Act also gave adult women the franchise, albeit only as a property-owning citizen (Sutch 1964).

The Abolition of Provinces Act 1875 allowed provincial legislation to remain in force. Sixteen years later, the Provincial Ordinances Act 1892 continued the Auckland Building Act, Dunedin Building and Christchurch Fire Prevention Ordinances. The Auckland and Christchurch legislation was repealed by the

Statutes Repeal Act 1907, and that of Dunedin by the Building Amendment Act 1993.

The Municipal Corporations Act 1886 further extended the coverage of council by-laws, although buildings continued to play a minor part – less than 8% by count of the by-law coverage for all three acts. Analysis of a part of the chimney by-law shows a direct link to the (London) Metropolitan Building Acts 1844 and 1855 (Isaacs 2018a).

Local government continued to implement and develop their own building by-laws. By 1923, 37 towns, boroughs or cities had their own by-laws dealing with the use of timber in construction (NZ State Forest Service 1924)

1.2 *Early attempts at national building by-laws*

The first attempt to create a national building code, albeit only for timber frame buildings, came from the 1924 “Building Conference Relating to the Use of Timber in Building-Construction”, which, in turn, made use of the 1922 American “Recommended Minimum Requirements for Small Dwelling Construction” (Isaacs 2018b). The 3 February 1931 earthquake, which destroyed the Napier City CBD and shook the rest of the country, led to a demand to include seismic issues in building codes. Central Government appointed a Building Regulations Committee which advocated a uniform Building Code and this, in turn, became the ten-part New Zealand Standard Model Building By-law (NZSS 95), first published in 1935 (Galbraith 1939). The ten sections were able to be adopted in part or whole, and/or amended as the Council (or more likely the city surveyor or engineer) desired.

2 BUILDING BY-LAWS 1870–1930

This paper explores the development of building controls under the Municipal Corporations Acts in two major 19th-century cities, Dunedin and Wellington. It covers the period from 1870 to the 1930's, prior to the adoption of NZSS 95. Building controls in Dunedin had been in place under Provincial Government legislation since 1862, but this was not the case in Wellington (Isaacs 2018a).

2.1 *Analysis process*

A complete set of building bylaws for Wellington and Dunedin were identified and then obtained. The Municipal Corporations Acts 1867 (Section 191) and 1876 (Section 340(2)) required by-laws be published, although from the Municipal Corporations Act 1886 only public notification was required. An extensive search of the online historic newspaper database PapersPast (paperspast.natlib.govt.nz) and the official New Zealand Government Gazette provided initial lists of such notifications. Wellington and Dunedin City Archives assisted the researchers

to obtain electronic copies of by-laws, regulations, and amendments which were transferred to a word processor file and then to a spreadsheet database for analysis.

2.2 *Dunedin city*

The first Dunedin “Building Regulations” (passed 23 February 1870, in force 25 May 1870, 54 clauses) were part of the 1870 “General By-laws for the City of Dunedin”. The 54 building clauses provided for: classifications; permit application processes; construction of footings and pier foundations; party walls; external walls and chimneys; construction of auxiliary buildings close to dwelling houses; the regulation of building districts; and applicability of certain regulations. They were under the control of city surveyor, Samuel H. Mirams (formerly of Melbourne) (White 1993).

These regulations were amended in 1874 (22 July 1874, 55 clauses), possibly in response to major land reclamation increasing the area of the commercial zone, with minor changes plus the addition of requirements for commercial ovens, furnaces, etc., to be made of brick or stone and at least 18 inches (46 cm) away from nearby buildings.

The Municipal Corporations Act 1876 increased council's powers, so amendments were made in 1877 (24 August 1877, in force 26 September 1877, 64 clauses). These included reducing fire risk restricted buildings, planning and the administration of construction. The three main changes were with respect to penalties, chimneys, and walls.

Following the 1879 “Octagon fire” in the central business district, the 1881 amendment (1 November 1881, in force 1 December 1881, 70 clauses) again increased complexity and made minor changes, principally with respect to structure, interpretation and penalties for non-compliance. The use of fire-resistant lath-and-plaster for wall linings was promoted over (timber) tongue-and-groove panelling.

Additional powers were given to councils under the Municipal Corporations Act 1887, so the 1890 revision (12 November 1890, 74 clauses), both consolidated all city by-laws into a single document and continued the focus on protection from fire, structure, and the use of stone and concrete for construction. The erection of tents was, for the first time, constrained in Dunedin.

Following the amalgamation of Dunedin City Council, the Caversham, South Dunedin, and the North-East Valley Borough Councils into the City of Dunedin, the 1912 by-law (24 January 1912, in force 1 April 1912, 217 clauses) consolidated and amended the existing by-laws. The replacement, in 1906, of long-serving city surveyor S.H. Mirams by consulting engineer George Gough (formerly of Scotland) (Cyclopedia Company Limited 1905) helped set the scene for this major revision.

These first by-laws of the 20th century were revolutionary, dealing with larger scale buildings under a more controlled building process. For the first time,

clauses were added dealing with open space in new developments, ventilation, safety, and safe egress. The 1906 San Francisco, USA, earthquake had established the benefits of reinforced concrete which were also incorporated.

The next change, not analysed in this paper, incorporated the New Zealand Model Building By-law NZSS 95 into the 1936 Dunedin City by-law (6 July 1936, in force 1 September 1936).

2.3 *Wellington city*

Wellington had general by-laws in 1871 that dealt with nuisance, maintenance of public places, offensive trades, horse and carts, and fire. It was not, however, until the 1873 Building Regulations (23 December 1872, in force 1 June 1873, 43 clauses) that there was coverage for the construction of walls, chimneys, fireplaces or furnaces and architectural elements.

The 1877 Building Regulations (1 November 1877, in force 1 January 1878, 37 clauses) divided the city into four districts, each with specific provisions, while refining coverage. Before its passing, a draft of the proposed regulations had been discussed at a conference of architects and the city surveyor – a process to be continued in future years.

An amendment was passed on 12 March 1878 which was then incorporated in the 1879 Building Regulations (9 September 1879, in force 1 October 1879, 42 clauses). A fire in the city on 15 June 1879 destroyed 30 buildings across 10 acres (4 hectares) (Evening Post, p. 2, 16 Jun 1879), possibly leading to the requirements for the removal of shingle (timber) and its replacement by non-combustible roofing. Minor amendments were passed in 1880, 1881 and 1882.

The 1888 Building By-law (12 January 1888, in force 1 April 1888, 50 clauses) was the first prepared by new city engineer, Mr. B. Loughrey (formerly of Melbourne) (Evening Post, p. 2, 30 November 1883). Fire continued to be an ever-present danger, with major fires in 1885 and 1887. The primary focus of the by-laws continued to be on walls, chimneys, fireplaces, and roofs but with greater emphasis on planning and permits.

Mr Loughrey finished in 1889 and his assistant Mr G. Wiltshire was promoted to city engineer. Minor changes were made in the 1891 Building By-law (7 January 1892, in force 1 February 1892, 56 clauses).

The 1896 Building By-law (10 February 1896, in force 1 April 1896, 80 clauses) provided consolidation as well as division of the city into three districts and introduction of the city engineer (replacing the city surveyor) as the inspecting officer. Safe loading capacities were introduced for floors and roofs, while bracing and fixings were detailed for wooden buildings.

In 1898, the city's by-laws were consolidated (in force 1 June 1898, 86 clauses), and included new changes in applications, inspections, piles, sites on reclaimed land and open space. A new city engineer, Mr Rounthwaite, started in December 1898. A further amendment in 1903 (22 October 1903, in force 1

December 1903, 18 clauses) dealt with requirements for plans, building frontages, and enforcement.

Mr W.H. Morton became city engineer in March 1904, remaining until 1924. The Iron or Steel Structures By-law 1904 (21 April 1904, in force 2 May 1904) was the first Wellington by-law relating to construction materials other than brick, stone, concrete or timber.

The by-laws were again revised and consolidated in 1908 (30 January 1908, in force 1 April 1908, 228 clauses), and now included the design and construction of reinforced concrete and steel framed buildings. The old by-laws were reported as being “based on the old London by-law which was obsolete years ago” but the new one “resembles very closely the San Francisco by-laws drafted after the recent earthquake and fire” and was expected to offer “a brighter era ahead for building in Wellington than has been the case for the past ten years” (Dominion, p. 5, 10 Oct 1907).

The next changes, not included in this analysis, were in 1934 and 1940. The 1934 amendment (27 April 1934, in force 7 May 1934) added 114 new clauses to the existing by-laws, the last Wellington-specific by-laws, although following the framework of the yet-to-be-published NZS 95. The 1940 amendment (22 October 1940) resulted in NZSS 95 Parts I-VI being amalgamated with the existing city by-laws.

2.4 *Reasons for change*

From the original 1870 Building By-laws in Wellington, there were major revisions in 1896 and 1908 and in Dunedin in 1912. From 1890 to 1912, and again from 1913 to 1936, no significant changes were implemented.

There are many probable reasons for this by-law stability, but one possible reason is the person responsible for the by-law – the city engineer or city surveyor – was long serving. In Wellington, for the 60 years from 1870 to 1930, nine people held this role with 11 significant by-law alterations. In Dunedin, over this period, only six changes were made with four people in this position.

Changes also show a reactive response to disasters – major, local fires led to changes in the fire requirements, just as national or international earthquakes led to increased interest in managing the building response to seismic events.

3 ANALYSIS

For each major change, each clause in the by-law was examined, and its application determined under five main topics:

1. What ISSUE does this clause respond to?
2. What is the physical COMPONENT?
3. Who is concerned (PARTIES) with the clause?
4. What time or stage? (WORK TYPE)
5. What are the specified MATERIALS?

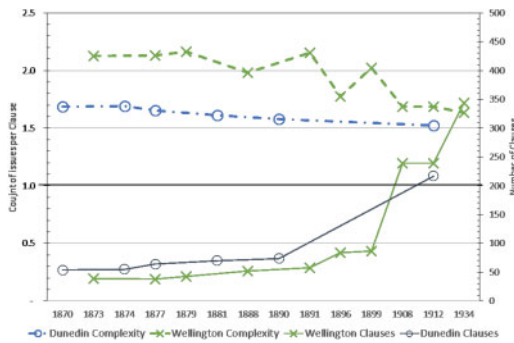


Figure 1. Building By-law Size and Complexity.

Each clause was then entered into standardised templates, allocating:

1. Primary level – Main category
2. Secondary level (refining) – Sub-category
3. Tertiary level (specifying) – Identifying term

To ensure consistency, this process was applied twice: firstly, when each by-law was transferred to electronic form and, secondly, when both cities were complete. Count tables were then generated for each of the by-laws and topics.

It should be noted that not all building by-law clauses deal with a single topic or have only one category level. As a result, it is possible for the counts to be greater than the number of clauses. For this paper, the analysis is based on the counts and, where appropriate, the number of clauses are also given.

3.1 Comparison

Figure 1 plots the building by-law complexity and the number of clauses for the various building by-laws. Dunedin is represented by a circle (○) and Wellington by a cross (x), while the number of clauses by a solid line (right axis) and the complexity by a dotted line (left axis). Complexity is the number of issues divided by the number of clauses – if each clause dealt with a single issue, then the complexity would be 1.

Figure 1 shows two interesting trends – in both cities the number of clauses in building by-laws increased (i.e. grew in size) while reducing in complexity (i.e. clauses were focused on fewer issues). While the complexity trended gradually downwards over the period (reducing from 1.69 to 1.53 for Dunedin, and from 2.13 to 1.63 for Wellington), the number of clauses showed very small growth until the end of the 1890s and then rapidly increased. An examination shows this clause growth was occurring in the coverage of the by-laws.

3.2 Coverage issues

As discussed, the coverage of each clause was allocated to appropriate topic categories, the first being the building issue being regulated. Table 1 lists the 12 building issues categories developed by this research, and, for both Dunedin and Wellington, the number

Table 1. Count of Building Issues by Category

Main Issue Category	Dunedin		Wellington	
	1870	1912	1873	1912
Access ¹		1		3
Administrative ²	11	21	13	21
General Provisions	9	53	9	51
Moisture	6	13	5	15
Permit ¹	6	28	4	35
Planning	10	27	6	57
Protection from Fire	30	32	34	44
Safety of Users ¹		13		12
Services & Facilities ¹	4	5	1	15
Stability	15	134	10	146
Utilities ¹		1		
Ventilation ¹		4		4
Sum of Counts	91	331	83	403
Total Clauses	54	217	39	239

For figures combined as: ¹ 'Misc.'; ² 'Administrative + Permit'

under the first (1870 or 1873) and last (1912) building by-law.

The most numerous issues at the start for both Dunedin and Wellington are under the issues of 'protection from fire' and 'stability'. Table 1 shows that by 1912 the number of clauses dealing with stability have the largest increase – in Dunedin starting with 15 clauses in 1870 increasing to 134 clauses in 1912 (8.9 times), while in Wellington stability clauses increased from 10 in 1873 to 146 in 1912 (14.6 times). For this research, 'stability' includes ground stability, structural elements, internal and external forces, structural protection, and durability. Next by count come 'administrative' requirements (measurement, application of rules, etc.) followed by 'planning' (site coverage, encroachments, site layout, subdivision, and town layout).

The number of clauses dealing with 'general provisions' (building classification, permits, interpretation, etc.) increased nearly six times from 1870 to 1912 in both Dunedin and Wellington. The 'utilities' issue related to the planning, owning and operation of electric generation, town gas or water works but it only appeared in the 1870's Wellington building by-laws, as they were moved to more specific by-laws.

There was a large increase in the number of clauses setting out the details of issuing of a 'permit' (required documentation and procedures), but clauses dealing with issues of 'moisture' (rainwater, groundwater, surface water, preventing entry of water) just increased by two in Dunedin and three in Wellington. The provision of 'services and facilities' within a building (hygiene, ventilation, natural and artificial lighting, gas, water, electricity, water and sewerage, management of solid waste) increased in number by just 1.25 times in Dunedin but 15 times in Wellington, albeit from just one clause in 1870 to 14 in 1921.

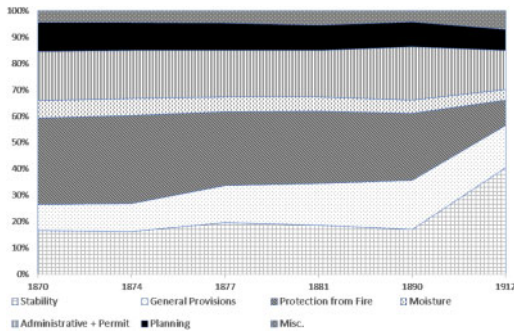


Figure 2. Dunedin Issues Count.

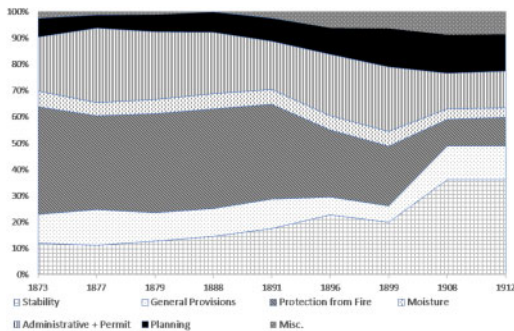


Figure 3. Wellington Issues Count.

Three issues that were not present in the 1870s by-laws appear later: ‘safety of users’ (safety at heights, hazardous materials, and any other construction work hazards); the provision of ‘access’ (passageways, exits, etc.) first appears in Wellington in 1908 and Dunedin in 1912, while ‘ventilation’ for sub-floor moisture management first appears in Wellington in 1891 and in Dunedin in 1912. To graphically track changes in the importance of the various issues over time, smaller categories were combined as noted in Table 1. These are used in Figure 2 for Dunedin and Figure 3 for Wellington which shows the percentage changes over time by count of the different issues. In both Dunedin and Wellington, there is noticeable growth in the relative importance of stability issues. In Dunedin, Figure 2 shows a reducing proportion of clauses dealing with protection from fire but this is a consequence of a relatively small increase in the absolute number.

Figure 3 similarly shows an increase in the count of clauses dealing with stability for Wellington, a reduction in protection from fire as well as administrative and permit clauses, but an increase in the number of clauses dealing with miscellaneous issues.

3.3 Materials

Question 5 in the clause analysis concerns the materials subject to building by-laws. Table 2 lists, for the first and last by-law under study, the 11 material divisions developed to categorise each clause. The term

Table 2. Count of Materials by Category.

Main Category	Dunedin		Wellington	
	1870	1912	1873	1912
Concrete & Mortar ¹	13	94	24	104
Concrete Block ¹	-	1	-	1
Exterior Surface ²	-	8	-	6
Finish ²	-	7	6	14
Fire Safety	7	9	6	12
Fired Brick & Clay ³	21	48	20	57
Masonry Elements ³	1	1	-	3
Metal	20	119	20	124
No material ⁴	18	89	12	105
Other ⁴	4	7	3	9
Stone	28	44	21	51
Wood	20	47	12	52
Sum	132	474	124	538
Total Clauses	54	217	39	239

For figure combined as: ¹ Concrete ² Finishes ³ Brick, clay & masonry ⁴ Other + no material

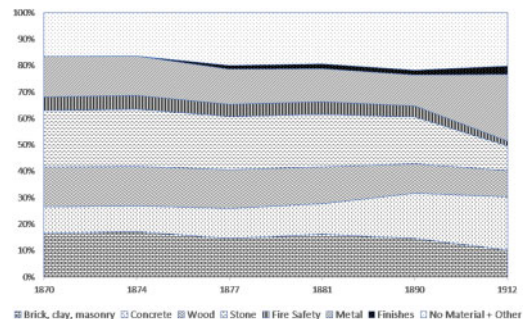


Figure 4. Dunedin Materials Count.

‘No material’ was used for clauses which did not apply to any material, e.g. issue of permits.

The count increases for all materials, but Table 2 shows that two – ‘metal’ and ‘concrete & mortar’ – have very large increases. Although both materials are present in the 1870s by-laws, this increase appears to be a response to changing construction practices with increased use of iron and steel in larger buildings and in-situ or off-site prefabricated concrete in a range of building types. ‘Concrete block’ refers to solid concrete blocks used for foundations of veranda posts, except in Wellington where ‘cinder’ or hollow blocks first appear in 1908. Hollow concrete blocks were first used in Wellington in 1904, but they were not widely used until after 1910 (Isaacs 2015).

The notes to Table 2 document the category combinations used for Figure 4 for Dunedin and Figure 5 for Wellington. The figures show the percentage changes over time for the count of the different materials. The counts of ‘other’ are small in Table 2, so have minimal impact on the combined grouping.

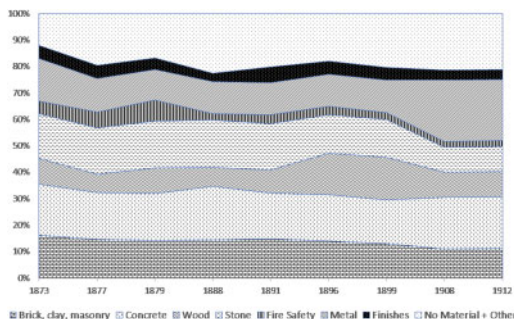


Figure 5. Wellington Materials Count

In Dunedin, the large decline in percentage of ‘brick, clay masonry’ and ‘stone’, along with a smaller decline in ‘timber’, are matched by increases in the percentages of ‘concrete’, ‘metal’ and ‘no material + other’, and the inclusion of ‘finishes’.

For Wellington, the changing pattern of materials is similar to that found in Dunedin. The proportions of ‘brick, clay masonry’ and ‘stone’ decline, while ‘concrete’, ‘metal’ and ‘no material + other’ increase. ‘Finishes’ were present from the 1873 by-laws.

4 DISCUSSION AND CONCLUSIONS

This paper contributes to an understanding of the development of the rules around construction, and hence to construction history.

British Prime Minister, Sir Winston Churchill is reported as saying in 1943, referring to the rebuilding of the debating chamber in the House of Commons: “we shape our buildings and afterwards our buildings shape us” (UK Parliament 2020). The same conclusion could be made with respect to building controls. Although building controls seldom specify design requirements, they can be interpreted to create tedious uniformity or interesting variations.

This paper has presented an analysis of the evolution of building by-laws in two key 19th century New Zealand cities – Dunedin and Wellington – over the period 1870 to the 1930s. Lists of 12 building issues and 11 material types were developed by this research. Future research is planned to examine the remaining topics identified in Section 3: component; parties; and work type.

The by-laws of the late 19th and early 20th centuries covered what many still consider to be the central issues of building controls: fire, structural safety, ventilation, management of water and the management of construction, etc. Safety of users, access and sub-floor ventilation do not appear until the beginning of the 20th century. Although an issue of structural safety, earthquake specific design first appears after the 1906 San Francisco, USA, earthquake, with the 1931 Napier, NZ, earthquake leading to major changes including the creation of the first NZ Standard Model Building By-law.

As new materials were developed, or older materials were used in new ways, by-laws adapted. Stone, although a permanent material, did not perform well under seismic loads, so it was joined by the better performing iron and steel framing, as well as reinforced concrete. The new hollow concrete blocks provided greater flexibility and lower cost, so they joined with in-situ concrete.

The revision and updating of by-laws, while formally council’s responsibility, on a day-to-day basis, were under management of the city engineer (or city surveyor). New appointees to these positions were more likely to make changes than longer term occupants who responded to new issues or undertook revisions.

Building by-laws have been shown to increase in size and coverage but reduce in complexity from the 1870s to 1930s. While the two are related (fewer issues per by-law clause require more clauses), the coverage also expanded not only to deal with the greater roles permitted in the various Municipal Corporation Acts but also new issues and materials.

Internationally, there is very limited analysis of the reasons for change in complexity and coverage in 19th-century building by-laws and, even more importantly, the consequences of these on modern building controls.

Of particular interest is Harper’s examination of the English Building Regulations from 1840 to 1914. He concluded that “By 1914, all the main building regulations that were considered essential for the safety of the general public had been established”. On the positive side, these led to improved public health and an acceptable level of sound building construction. On the less positive side, it allowed for ‘by-law houses’ (built with minimum design to minimum requirements) and for the development of controls under “a legal profession which was not overfamiliar with the world or practice of building” leaving “a legacy of many rigid, complicated and often archaic regulations” (Harper 1978, 1985).

This research provides a starting point for a similar examination of the consequences of New Zealand’s 19th-century building controls.

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8

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