Invercargill CITY COUNCIL Building Sector news

Issue No. 142 **Supplementary October 2011**

In this issue we have articles on the following subjects:

Department of Building and Housing

Practice Advisory No 13

Media Release issued by Department of Building and Housing – 30 September 2011

Canterbury Earthquake – Technical Investigation

Expert Panel Report on the structural performance of Christchurch Central Business District buildings in the 22 February 2011 aftershock.

New xtra-ductile 500E reinforcing mesh

DEPARTMENT OF BUILDING AND HOUSING – PRACTICE ADVISORY NO 13

The Department of Building and Housing has released a Practice Advisory to alert practising structural engineers assessing existing multi-storey buildings throughout New Zealand about issues relating to safety of stairs.

The Lyttelton earthquake (aftershock) of 22 February 2011 caused a number of stair failures in building in the Christchurch CBD. Although it is recognised that this earthquake made extraordinary demands on existing designs, the failure of stairs is of serious concern. The Department considers it imperative that circumstances of these failures are fully understood and the implications for similar buildings are New Zealand examined and acted upon.

The Practice Advisory is directed towards having owners of buildings to which members of the public have access, including office buildings, particularly those with scissor stair configuration, seek professional advice on whether any necessary retrofit work is necessary. It highlights the need for stairs designed to slide under seismic action to have adequate clearances and seating.

The report commissioned by the Department on the collapse of the stairs in the Forsyth Barr Building illustrates an example of the issues and concerns. This is one of three consultant reports on the Department's investigation into the structural performance of Christchurch CBD buildings in the 22 February 2011 aftershock. All reports, including the Expert Panel Stage 1 Report, are available on the Technical Investigation Section of the Department's website.

PRACTICE ADVISORY NO 13

Egress Stairs: Earthquake checks needed for some

This Practice Advisory is issued in response to concerns about stair collapses in Christchurch CBD in the 22 February 2011 Aftershock:

Background

The Lyttelton earthquake (aftershock) of 22 February 2011 caused a number of stair failures in buildings in the Christchurch CBD. Although it is recognised that this earthquake made extraordinary demands on existing designs, the failure of stairs is of serious concern. The Department considers it imperative that the circumstances of these failures are fully understood and the implications for similar buildings around New Zealand examined and acted upon.

The report commissioned by the Department on the collapse stairs in the Forsyth Barr Building [1] illustrates an example of the issues and concerns. A report prepared for the Royal Commission [2] provides further comment on the issues and some considerations that may assist structural engineers to decide on retrofit actions. Design considerations for stairs are offered in the SESOC draft Practice Note [3].

Purpose and Scope of Advisory

This Practice Advisory is to:

- Alert practising structural engineers assessing existing multi-storey buildings throughout New Zealand to issues relating to safety of stairs

It applies to all existing multi-storey buildings throughout New Zealand:

- To which members of the public have access, including office buildings, particularly those with scissor stair configuration, and
- Have stairs designed to slide under seismic action, particularly those with the gap-and-ledge stair detail.

Key concerns

- If the relative lateral displacements between adjacent floors of a building (the “inter-storey drifts”) are sufficiently large, a stair may be pulled off the ledge that supports the sliding end of the stair.
- The seating dimensions allowed in existing designs may not be sufficient to account for movements now expected.
- The maximum inter-storey drift in estimates of building displacement may not adequately account for variability and uncertainty.
- Details that have limited scope to allow closing movement may cause damage to the stair flights. This damage may shorten the flights and make them more likely to fall off their supports.

- Seismic gap details that have been partially or fully filled or are susceptible to being filled because of construction or maintenance errors may restrict or prevent closing movement

- Heavy finishes, fixtures and fittings in stairwells may come loose during an earthquake and fall and block the stairway or injure people using it.

Main points

1. Stairs designed to slide: Check if sliding is the designed intention or not:

    - This Practice Advisory applies to stairs that are detailed to slide on the end supports in order to accommodate the relative horizontal earthquake displacements between floors (known as “inter-storey drifts”).

    - Stairs that are “built in” to the supports/landings at both ends are not covered by this Practice Advisory.

2. Overall allowance for movement: Needs to be checked:

    - There are a number of loading Standards and material Standards that have prescribed the calculation of inter-storey drifts for NZ buildings (as far back as 1956). Typically, these design displacements are not consistent across the Standards. Therefore it is imperative that relative displacement between floors is calculated to the current Loadings Standard, NZS 1170.5.

    - Clearances and seatings for stairs should be capable of sustaining at least twice the Ultimate Limit State (ULS) inter-storey displacements (drift) as calculated in accordance with NZS 1170.5.

3. Stair movement that closes the gap between the end of the stair and the support: Check support detail.

    - Calculate the inter-storey drifts as per Item 2 above.

    - Check if the movement causes the sliding end of the stair to impact against the support (wall, beam or landing) - see Figure 1.

    - If the lateral movement of the stair closes the gap, causing impact on the support/landing:

        - Look to increase the gap.

        - Check implications of bracing action as the stair struts between floors, if gap should close:

            - on the stair flight

            - on the supports at each end of the stair

            - on the building, as the stairs can significantly stiffen the building through the bracing action between floors, via unintended load paths. This results in the building attracting seismic forces that may be much larger than originally considered in the design of the building.

    - Check gap left for closing movement of the stairs:

- Check for objects in gap, such as debris or floor levelling compounds that may have occurred during earlier repairs/new fit-outs. Remove these obstructions.

- Modify detail to prevent further objects in the gap impeding movement. For example, cover plates over the gaps.

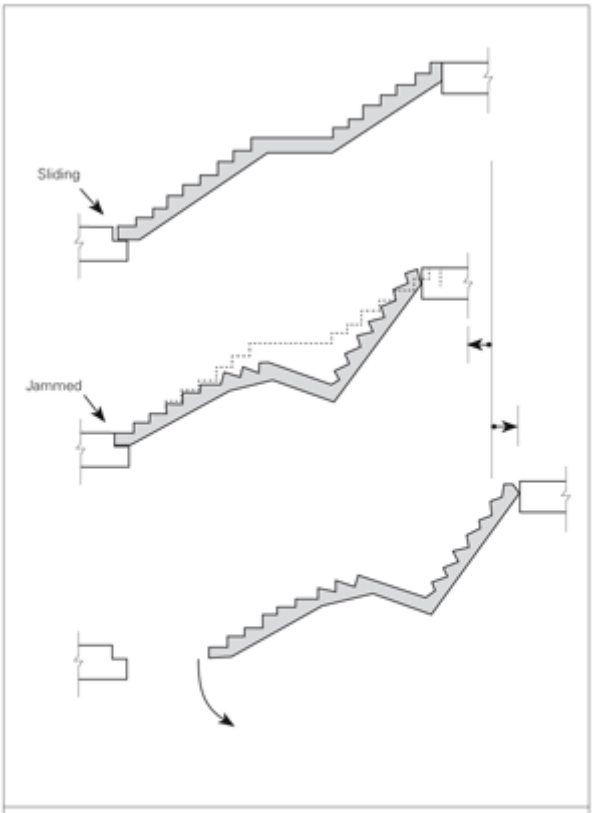

Figure 1 – Inter-storey drift along the stair compresses the stair shortening it.

When earthquake reverses, the stair can now fall off the supporting ledge. [2].

4. Progressive collapse: one stair falling on to the stairs below and collapsing them all: mitigate:

- Using the inter-storey drifts from Item 2 above, construction tolerances, residual width of seating, spalling of the concrete ends of the stairs or the edges of the supporting ledge and other factors, determine what should be the width of the seating (contact area) between the sliding end of the stair and the support. If the available width of support is inadequate, install catch-frames or similar safety devices or engineer extensions of the ledge to ensure adequate width of support for the end of the stair.

- Stairs can swing sideways relative to its length. This can either damage the lining to the stairwells causing blockage of the egress path or, more significantly, can overload the connection at the other end of the stair, where the stair is fixed in to the support. This overload can result in failure of the bars or connection details there, resulting in collapse of that stair. The ability of the connections at the fixed ends must be checked and if there are issues, these need to be mitigated by design, i.e. by using NZS1170.5 Section 8, Requirements for Parts and Components.

5. Wall finishes, fixtures and fittings within the stairwells: Make these safe:

- Secure or remove any wall finishes that can not sustain the calculated inter-storey drift and could dislodge in earthquake shaking or building movement (particularly under inter-storey drifts).

- Restrain or remove any fixings and fixtures in the stairwells. Restrain in accordance with NZS 4219.

Actions to be taken

The Department advises the following actions from the various parties:

- Structural engineers: When undertaking detailed assessments of buildings, strongly recommend to your client that checking of the stairs is included in your brief.

- Recommend that any necessary retrofit measures be carried out as soon as possible. These should bring the stair earthquake safety performance to as nearly as is reasonably practicable to that of a stair in a new building of similar structural characteristics (see “when designing new buildings”).

- Territorial authorities: When advising owners of the need to renew their annual Building Warrant of Fitness Territorial Authorities are advised to bring this practice advisory to the attention of owners.

- Building Consent Authorities: When building consent applications are made for any work on a multi-storey building with sliding stair details, Building Consent Authorities are advised to bring this practice advisory to the attention of owners.

- Building owners with concerns: Owners should contact a chartered professional engineer with suitable qualifications and experience to review the stair design and make recommendations for retrofit work.

Do
● Do use details which allow stair flights to slide on landings without restrictions
● Do take into account variability and uncertainty in estimates of building displacement to provide resilience. Clearances and seatings for stairs should be capable of sustaining at least twice the Ultimate Limit State (ULS) inter-storey displacements as calculated in accordance with NZS 1170.5, after allowances for construction tolerances.
● Do take account of disproportionate collapse, i.e. progressive collapse resulting from a stair flight failure
Don't
● Don’t use details that restrict closing movement that may cause damage to the stair flights. This damage may shorten the flights and make them more likely to fall off their supports. The freedom of movement may be further restricted by debris or other material in the movement space.
● Don’t use seismic gap details, particularly gap-and- ledge stair detail, which are susceptible to being filled by construction or maintenance error and thereby restricting closing movement.
● Don’t allow stair wells to have heavy finishes, fixtures or fittings that could come loose during earthquake movement. They may fall and block the stairway or injure people evacuating the building.

References

1. Beca Carter Hollings and Ferner Ltd (2011), Investigation into the Collapse of the Forsyth Barr Building Stairs on 22 February 2011. Report prepared for the Department of Building and Housing, September 2011

2. Bull, D (2011), Stair and Access Ramps between Floors in Multi-storey Buildings. Technical paper prepared for the Canterbury Earthquakes Royal Commission, August 2011

3. SESOC Practice Note: Design of conventional structural systems following the Canterbury Earthquakes, September 2011

This document's status

Note that this Practice Advisory is issued as Guidance Information in accordance with Section 175 of the Building Act 2004 and if used, does not relieve any person of the obligation to consider any matter to which the information relates according to the circumstances of the particular case.

MEDIA RELEASE ISSUED BY THE DEPARTMENT OF BUILDING AND HOUSING

Department of Building and Housing
Te Tari Kaupapa Whare

Strong ground shaking and extremely high vertical accelerations were among the principal reasons why three key Christchurch buildings failed in the 22 February earthquake, the Department of Building and Housing announced today.

The Department today released its report from its technical investigation into three large multi-storey Christchurch buildings - Pyne Gould Corporation (PGC), Forsyth Barr and Hotel Grand Chancellor buildings.

The investigation has been conducted by leading New Zealand engineering consultants and their findings peer reviewed by a panel that includes experts with international experience and standing.

Department Deputy Chief Executive Building Quality, David Kelly, said the technical investigation into the fourth building – the Canterbury TV (CTV) building – was still ongoing and that report and the final recommendations from the expert panel involved in the investigation would be released when it was completed.

“The investigation into the CTV building is incredibly complex. It’s important the time is taken to conduct a thorough investigation to ensure the findings are robust.”

Mr Kelly said the recorded ground accelerations in the 22 February earthquake were markedly greater than those in the 4 September 2010 earthquake. The recorded values of peak vertical accelerations in the Port Hills were among the highest ever recorded anywhere in the world.

The report released today found the PGC, Forsyth Barr and Hotel Grand Chancellor buildings failed principally because 22 February was an extremely violent earthquake and, when they were built, design requirements were not as rigorous as they are now.

“In the case of the PGC building, where there was tragic loss of life, the shaking was much more intense than the building was designed for when it was built in 1966. The building lacked resilience and the ability to move and respond without losing strength.

“Based on the findings, the expert panel has made a number of recommendations to improve building standards and best practice. The Department is taking action on all the recommendations with immediate focus on the panel’s priority recommendations,” Mr Kelly said.

“Today we issued an alert to structural engineers and local authorities to ensure that owners of multi-storey buildings have all the main exit stairs checked. This is to ensure they have sufficient allowances for movement.

“We are also working with the Structural Engineering Society of New Zealand (SESOC), the design profession, and Standards New Zealand on aspects of design, building detailing and construction. “The report and its recommendations have now been referred to the Royal Commission of Inquiry looking into the Canterbury earthquakes.”

A copy of the technical investigation reports released today can be downloaded from the DBH website: http://www.dbh.govt.nz/canterbury-earthquake-technical-investigation

For further information contact: Avon Adams on 027 258 2849 (Manager Stakeholder Engagement and Communications, Department of Building and Housing)

CANTERBURY EARTHQUAKE – TECHNICAL INFORMATION

The Department of Building and Housing is investigating the performance of key buildings and the reasons why some of them failed.

The investigation includes the following buildings:

- Canterbury Television (CTV)
- Pyne Gould Corporation (PGC)
- Forsyth Barr and
- Hotel Grand Chancellor.

The Department engaged leading New Zealand engineering consultants to assist with the investigation. It also appointed a panel of experts who have provided guidance on the methodology of the investigations and peer reviewed the findings.

Read about the experts appointed to assist with the investigation »

First report released today

The Expert Panel Report on the PGC, Forsyth Barr and Hotel Grand Chancellor buildings has been released 30 September 2011. The Department also released a report which outlines its response to the findings.

The main findings are as follows:

- Strong ground shaking and exceptionally high vertical accelerations were among the principal reasons that Christchurch's PGC, Forsyth Barr and Hotel Grand Chancellor buildings failed in the aftershock of 22 February 2011.
- At the time the PGC, Forsyth Barr and Hotel Grand Chancellor buildings were built, design requirements were not as rigorous as they are now.
- In the case of the PGC building, where there was tragic loss of life, the shaking was much more intense than the building was designed for in 1963 and the building lacked resilience and the ability to move and respond without losing strength.

The following reports are available to download

Expert Panel Report [PDF 1.90 MB, 66 pages]

Forsyth Barr Building Stairs Site Examination and Materials Test [PDF 4.53 MB, 51 pages]

Pyne Gould Corporation Building: Site Examination and Materials Tests [PDF4.28 MB, 46 pages]

Technical Investigation into the Structural Performance of Buildings in Christchurch [PDF 317 KB, 10 pages]

Report on the Structural Performance of the Hotel Grand Chancellor [PDF 15.4 MB, 87 pages]

Investigation into the Collapse of the Pyne Gould Corporation Building [PDF 2.4 MB, 51 pages]

Pyne Gould Corporation Building Appendices [PDF 10.7 MB, 128 pages]

Investigation into the Collapse of the Forsyth Barr Building Stairs [PDF 2.8 MB, 52 pages]

Forsyth Barr Building Stairs Appendices [PDF 12.6 MB, 169 pages]

Report on CTV investigation

The technical investigation into the CTV building is still ongoing. That report and the final recommendations from the expert panel involved in the investigation will be released when complete. Reaching a firm conclusion on the reasons the CTV building failed is not a simple process and requires additional analysis. It is important the Department takes time to conduct a thorough investigation and that the findings are robust. The families of people who died in the building deserve nothing less.

The Department will progress the CTV investigation as fast as possible, but it is critical to ensure the investigation is thorough and robust. There are several possible reasons the building failed and the expert panel has recommended additional analysis.

This will include a sophisticated international best-practice method of analysis, that uses the measured ground motion, including vertical ground motions, and examines the likely response of a building at every step in time. This dynamic analysis builds on the work to date and gives a much more realistic and credible understanding of the likely building response.

The Royal Commission of Inquiry, announced on 14 March 2011, will also take into account, but will not be limited by, the results of this investigation.

Read about the Canterbury Earthquakes Royal Commission

Contact details for the investigation:

Telephone: 0800 242 243
Email: chchinvestigations@dbh.govt.nz
Read the full terms of reference for the investigation »

EXPERT PANEL REPORT ON STRUCTURAL PERFORMANCE OF CBD BUILDINGS IN THE 22 FEBRUARY 2011 AFTERSHOCK COVERING PYNE GOULD CORPORATION, HOTEL GRAND CHANCELLOR AND FORSYTH BARR BUILDING

Department of Building and Housing
Te Tari Kaupapa Whare

On 22 February 2011 a Magnitude 6.3 aftershock centred near Lyttelton caused severe damage to Christchurch, particularly the Central Business District (CBD), eastern and southern suburbs, the Port Hills, and Lyttelton. Ground shaking intensities in Christchurch City, both horizontal and vertical, were in excess of those used as a basis for building design at any time up to the present day. The recorded values of peak vertical accelerations on the hills were amongst the highest ever recorded worldwide. Recorded accelerations in the CBD were markedly greater than those in the Darfield earthquake of 4 September 2010. Many masonry buildings or parts of buildings collapsed in the CBD and many modern building structures were critically damaged.

The Department of Building and Housing (the Department) identified four large multi-storey buildings to be investigated in the Christchurch CBD. The buildings included in the investigation were the Canterbury Television Building (CTV), the Forsyth Barr Building, the Hotel Grand Chancellor and the Pyne Gould Corporation Building (PGC). Two of these buildings experienced collapse and the other two experienced significant failure of building components, including stairs, columns and walls.

The Department engaged leading New Zealand engineering companies to assist with the investigation. It appointed a panel of experts to provide guidance on the methodology of the investigation and to peer review the findings.

The Department has completed the first stage of its investigation. The Stage 1 Report covers the findings for the PGC, Hotel Grand Chancellor and Forsyth buildings. The investigation into the CTV building is more complex and the expert panel has recommended further analysis, including “inelastic time history analysis” (ITHA). Therefore the CTV investigation will be part of a Final (Stage 2) Report that covers all four buildings.

SUMMARY OF FINDINGS OF INVESTIGATION INTO PGC, FORSYTH BARR AND HOTEL GRAND CHANCELLOR BUILDINGS

Key findings

Strong ground shaking and vertical accelerations in the 22 February aftershock were among the principal reasons the three buildings failed. The recorded intensity of ground shaking exceeded design standards for 2010 buildings, which are higher than standards for building designed in the 1960s and 1980s. Vertical acceleration was exceptionally high. The duration of shaking was short; a longer duration would be likely to have a greater effect on buildings.

The most likely reasons the buildings failed were as follows:

Pyne Gould Corporation (PGC) Building

- The structure was designed in the 1960s and met the design requirements of the time. Additional steel props were added to the structure in 1988. When compared with the

current Building Code for a new building, the PGC building would have achieved about 30-40% of New Building Standard (NBS).

- The ground shaking on 22 February 2011, particularly east west shaking, was more intense than the building was designed to withstand. The building lacked resilience and the ability to move and respond without losing strength.
- The east core reinforced concrete wall failed between levels 1 and 2; floors were displaced; this led to the failure of columns and beam-column joints; this caused the floors to collapse.

Forsyth Barr Building (stairs)

- The Forsyth Barr building was designed in 1988. In the aftershock of 22 February 2011, two flights of stairs collapsed; the main stairs collapsed from Level 15 down; the other flight collapsed from Level 13.
- In modern flexible buildings, stair supports are designed to slide horizontally in an earthquake (the space provided to allow for this movement is known as the "seismic gap). This stops the stair from stiffening the structure and the stair unit being compressed and falling off its supports. The seismic gap in the building's drawings met the design requirements of the 1980s; it would not satisfy current Building Code requirements.
- The lower support on which the stair slides couldn't accommodate the movement in the 22 February 2011 aftershock. Some gaps may have been less than specified or had debris or mortar in them. Calculations of movement indicate that if the gaps had been full size or free of debris, the stairs would still have fallen off their supports.

Hotel Grand Chancellor Building

- The Hotel Grand Chancellor was built in the 1980s. The investigation found that, in general, the building was well designed and that the structure was robust enough to prevent a more catastrophic collapse.
- During the intense shaking of the 22 February 2011 aftershock a critical concrete shear wall failed. This wall supported approximately one-eighth of the building's mass and was also expected to carry substantial earthquake loads. The south-east corner of the building dropped by about 800mm and the building developed a horizontal lean which caused the stairs to collapse.
- The strong ground shaking and exceptionally high vertical accelerations exceeded design standards for a building of this type. This placed higher axial loads on the wall than allowed for in the design.

Liquefaction and lateral spreading did not have a significant effect on any of the three buildings. There was no evidence of foundation settlement or failure. The 4 September 2010 earthquake and 26 December 2010 aftershock do not appear to have significantly reduced the earthquake resistance of the buildings.

PRIORITY RECOMMENDATIONS BY THE PANEL

Egress Stairs

An urgent Practice Advisory from the Department of Building and Housing advising owners of buildings to check that all main exit stairs have sufficient allowance for movement.

Department of Building and Housing action:

- On 30 September 2011, the Department released a Practice Advisory which is available on the Department's website www.dbh.govt.nz.
- The Department has written to Chief Executives of Territorial Authorities asking them to alert owners of multi-storey buildings to the importance of having their stairs checked by a chartered professional engineer.

- Advise property owners via industry organisations such as the Property Investors Federation, the commercial arm of REINZ; and
- Advise the sector through organisations such as IPENZ, NZIA, ADNZ, the Construction Industry Council, RMBF and CBANZ.

Concerned building owners should obtain a report from a chartered engineer experienced in structural design on the earthquake vulnerability of the stair system, which may recommend undertaking retrofit work.

WALLS AND COLUMNS

A thorough review of particular aspects of the requirements for design, detailing and construction of walls and columns.

Department of Building and Housing Action

- The Department is working with the Structural Engineering Society of New Zealand (SESOC) on a practice advisory on construction and with the design profession and Standards New Zealand to determine any necessary changes in standards or practice, and/or any education and training needs. Planned programme of communicator with the sector, as undertaken with the stair recommendations.

Lightly reinforced shear walls with little or no confining steel

Owners of buildings built before 1976 should be alerted to the fact these walls can be vulnerable in earthquakes and should obtain advice from an engineer.

Department of Building and Housing Action:

- Practice Advisory and owner alert to be released this year (2011). Planned programme of communication with the sector, as undertaken with the stair recommendations.

The panel made other recommendations about the design of new buildings which will be further considered for the final report. The Department of Building and Housing will support appropriate investigations leading to recommendations for improvements in standards, practice or education/training regimes.

PERSONNEL INVOLVED IN THE INVESTIGATION

Engineering Consultants
- Beca Consultants
- Dunning Thornton Consultants Ltd
- Structure Smith
- Hyland Fatigue and Earthquake Engineering

Members of the Panel

Mr Sherwyn Williams, construction law expert (Chair)

Professor Nigel Priestley, former Professor of Structural Engineering at the University of California and former senior lecturer at Canterbury University (Deputy Chair);

Associate Professor Stefano Pampanin, a Structural Engineer who is currently an Associate Professor at the University of Canterbury;

Dr Helen Anderson, a seismologist and former Chief Executive of the Ministry of Research, Science and Technology;

Leading Geotechnical Engineer Peter Millar;

Architect Marshall Cook, past Adjunct Professor of Design at Unitec, whose work includes large urban design projects;

Mr Peter Fehl, who has extensive expertise in the construction industry;

Mr George Skimming, Director Special Projects at Wellington City Council with extensive experience in building consent practice;

Structural Engineers Mr Adam Thornton, Mr Ron Jury and Dr Clark Hyland the investigating consultants

EARTHQUAKE PRONE BUILDINGS

The Panel saw a need to improve public awareness of the potential danger represented by older buildings that do not meet current design requirements. It also considered changes to the legislation covering earthquake-prone buildings, even though it is strictly outside the terms of reference. This was prompted by the collapse of the PGC building, which was not regarded as earthquake-prone. Observations include:

- The need for educational initiatives to improve public awareness of the potential danger of older buildings which do not meet current design requirements.
- Consider promoting the value of buildings that perform well in earthquakes.
- Consider changing the approach to defining earthquake-prone buildings and the requirements for strengthening.
- Territorial authorities should consider: Actively identifying and dealing with earthquake-prone buildings; shorter timeframes for action.
- Consider giving territorial authorities the power to require earthquake strengthening when a building is significantly altered or when occupancy levels are significantly increased.

Department of Building and Housing Action:

The Department is already doing work on this and is preparing a submission to the Canterbury Earthquake Royal Commission of Inquiry which will cover possible changes to legislation covering earthquake-prone buildings. The Department is actively engaged with the Royal Commission and will work with them as they consider this issue, including implementing any recommendations made in its final report.

NEW XTRA-DUCTILE 500E REINFORCING MESH

Council has received the following information regarding Ductile 500E Mesh from Eurosteel.

Please check with your local supplier as to the availability of the new 500E Ductile Reinforcing Mesh.

eurocorp.co.nz > Reinforcing > **Grade 500E Ductile Mesh**

Grade 500E Ductile Mesh

New Xtra-Ductile 500E mesh

New Xtra-Ductile 500E mesh

Xtra-Ductile -500E

Specify and use with confidence.

Euro Corporation is proud to announce another first

We are the first company in New Zealand to launch a compliant, 500E ductile reinforcing mesh in response to recent changes to the New Zealand Building Code.

With the August 1, 2011 DBH announcement that 500E ductile mesh is now required for all slabs-on-ground construction in order to comply with Acceptable Solution B1/AS1, the challenge for us was how quickly we could provide a simple and easy to use solution for our customers.

We set ourselves a target of just 8 weeks to do this.

Ideally we needed to design and produce a new 500E reinforcing mesh, which met all of the applicable codes and standards, but was similar to the 665 mesh builders and specifiers are used to. We thought this was the best way to make life easy for builders, specifiers and building inspectors too.

We are pleased to announce we made it!

The first sheets of EuroSteel SE615-500 Xtra-Ductile 500E are available for sale through selected merchant outlets.

For reasons we are all very aware of, initial supply will focus on Christchurch in support of the city's efforts to rebuild.

Supply to the rest of the country will begin soon after, so keep in touch with your builders' merchant so you know when it will be available in your area.

To make things even easier, you can download a technical specification sheet to quickly learn about the product and begin to specify it.

You can also download useful Question & Answer material which has been designed specifically for builders, specifiers and building officials Just click on the relevant links below.

EUROSTEEL
WE'RE RAISING THE BAR

Builder

Q & A PDF Download

Q Why do we need a new, ductile mesh?

A With recent events in Canterbury and the impact of ground movement on various structures, it has become clear that the failure of reinforced slabs on ground was in part due to the low ductility of steel and mesh used in their construction as allowed for in the code at the time.

The Department of Building & Housing has recently changed Clause B1 Structure of the NZBC. As a result, 500E mesh is required in the concrete slabs-on-ground of buildings built in accordance with NZS 3604: 2011 where compliance is being claimed by Acceptable Solution B1/AS1.
This requirement applies across all of NZ. More details can be found on the DBH website www.dbh.govt.nz.

Q What is the difference between the existing 665 mesh and the new EuroSteel SE615-500 Xtra-Ductile?

A EuroSteel SE615-500 Xtra-Ductile is made from steel that has had Vanadium added to it. This means that the wire is more ductile and can flex further and more times before it fails.

The wire drawn from this type of steel has been used in both the cross and longitudinal wires in the EuroSteel SE615 Xtra-Ductile mesh. This means each sheet has greater ductility when compared to existing low ductility mesh options such as 665.

Q 665 mesh was so easy and simple to use, in what way is the new EuroSteel SE615-500 Xtra-Ductile mesh similar to the existing 665 I use?

A EuroSteel SE615-500 Xtra-Ductile has been kept similar to the existing 665 where possible while still meeting performance and code requirements.

For example the net cover per sheet remains at 7.525m2. The sheet size has been retained at 4.58m x 1.97m for ease of transport and handling. With wires at 150mm centres and laps of 200mm, it retains many of the features of the popular 665.

The diameter of the wire used, 5.5mm, also means concrete cover can be maintained even in areas of complex overlays.

We have done this to make it as easy and as convenient as possible for specifiers and the trade.

Q With the EuroSteel SE615-500 Xtra-Ductile being similar to 665, how will I be able to tell the difference?

A To make identification easy, each sheet has a durable, pink tag attached to it. Each tag carries two codes.

The first is the product code, SE615-500, and the second is an alpha numeric code assigned to the specific manufactured batch for that individual sheet.

The tag is designed to remain on the product even when encased in concrete

Individual packs of the product have an A4 identification card under the top sheet of mesh.

Q Will EuroSteel SE615-500 Xtra-Ductile mesh cost more?

A Yes. With the addition of Vanadium to the steel, the fact the manufacturing process requires more precision than non-ductile meshes, SE615-500 Xtra-Ductile will cost more to make.

In addition, each batch is tested by an independent third party before it is released for sale.

These costs will be reflected in the price.

Q How can I be sure EuroSteel SE615-500 Xtra-Ductile complies?

A Each batch of EuroSteel SE615-500 Xtra-Ductile mesh is tested by an independent third party against the requirements of AS/NZS4671:2001 before it is released for sale. A test certificate is issued for each batch.

Test certificates are available from Euro Corporation on request.

Q Where can I buy SE615-500 Xtra-Ductile?

A SE615-500 Xtra-Ductile mesh is sold by Euro Corporation through its network of builder's merchants and reinforcing specialists. Our primary outlets are Carters, Bunnings and selected ITM and Mitre10 stores and a number of independent stores nationwide.

Please note that initially, priority will be given to supply to Christchurch City, Waimakariri and Selwyn Districts.

Q What are the lap requirements of EuroSteel SE615-500 Xtra-Ductile?

A Recommended standard laps for the product are set at 200mm. This is based on DBH requirements and NZS3101. Please download a specification sheet for a lap diagram and more detail.

Q When will I be able to buy EuroSteel SE615-500 Xtra-Ductile mesh?

A The new mesh is available in Canterbury through selected Builder's merchant outlets.

Q When will the new mesh be available outside of the Christchurch region?

A Euro Corporation is currently building stocks of the new mesh in both the North and South Island. The new mesh will be available on a stock rollover basis and priority, at least in the early stages, will be given to those Christchurch customers. It is expected that within a short period we will be able to satisfy current customers and new customers nationwide.

Specifier

Q & A PDF Download

Q Why do we need a new, ductile mesh?

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The wire drawn from this type of steel has been used in both the cross and longitudinal wires in the EuroSteel SE615-500 Xtra-Ductile mesh. This means each sheet has greater ductility when compared to existing low ductility mesh options such as 665.

Q Which standard defines the new 500E Mesh?

A All steel reinforcing mesh and steel reinforcing bar used in New Zealand must comply with the requirements of AS/NZS4671:2001. This Standard defines what is required in a ductile product.

AS/NZS4671:2001 can be purchased from www.standards.co.nz

Q What is the critical information I need to specify EuroSteel 615-500 Xtra-Ductile?

A Details are on the specification sheet which can be downloaded from www.eurocorp.co.nz .

Key items are:

- Ductility Class E (Earthquake)
- Yield Stress ≥ 500 Mpa
- Uniform Elongation (Agt) ≥ 10%
- Weight per Sq M 2.49kg/m2
- Nett Cover = 7.525m2
- Complies with AS/NZS4671:2001

Q With the EuroSteel SE615-500 Xtra-Ductile being similar to 665, how will I be able to tell the difference?

A To make identification easy, each sheet has a durable, pink tag attached to it. Each tag carries two codes.

The first is the product code, SE615-500, and the second is an alpha numeric code assigned to the specific manufactured batch for that individual sheet.

The tag is designed to remain on the product even when encased in concrete

Individual packs of the product have an A4 identification card under the top sheet of mesh.

Q How can I be sure EuroSteel SE615-500 Xtra-Ductile complies?

A Each batch of EuroSteel SE615-500 Xtra-Ductile mesh is tested by an independent third party against the requirements of AS/NZS4671:2001 before it is released for sale. A test certificate is issued for each batch.

Test certificates are available from Euro Corporation on request.

Q Where can I get more detailed technical information on SE615-500 Xtra-Ductile?

A The easiest way to get additional technical information is to download a specification sheet from the Euro Corporation website www.eurocorp.co.nz. Visiting our website will also ensure that you have the latest version of the product specification.

Q What are the lap requirements of EuroSteel SE615-500 Xtra-Ductile?

A Recommended standard laps for the product are set at 200mm. This is based on DBH requirements and NZS3101. Please download a specification sheet for a lap diagram and more detail.

Q Who carried out the testing on the product and where am I able to get a copy of the test report for the new EuroSteel SE615-500 Xtra-Ductile?

A Testing related to the development of the product was conducted by Dr Chris Arlington of Holmes Solutions, an Engineering Consultancy based in Christchurch (www.holmessolutions.com)

An executive summary of the test report is available on request. Availability of the full report will be assessed on a case by case basis. This is due to the proprietary nature of the information and data it contains.

Building Officials

Q & A PDF Download

Q Why do we need a new, ductile mesh?

A With recent events in Canterbury and the impact of ground movement on various structures, it has become clear that the failure of reinforced slabs-on-ground was in part due to the low ductility of steel and mesh used in their construction as allowed for in the code at the time.

The Department of Building & Housing has recently changed Clause B1 Structure of the NZBC. As a result, 500E mesh is required in the concrete slabs-on-ground of buildings built in accordance with NZS 3604: 2011 where compliance is being claimed by Acceptable Solution B1/AS1.

This requirement applies across all of NZ. More details can be found on the DBH website www.dbh.govt.nz

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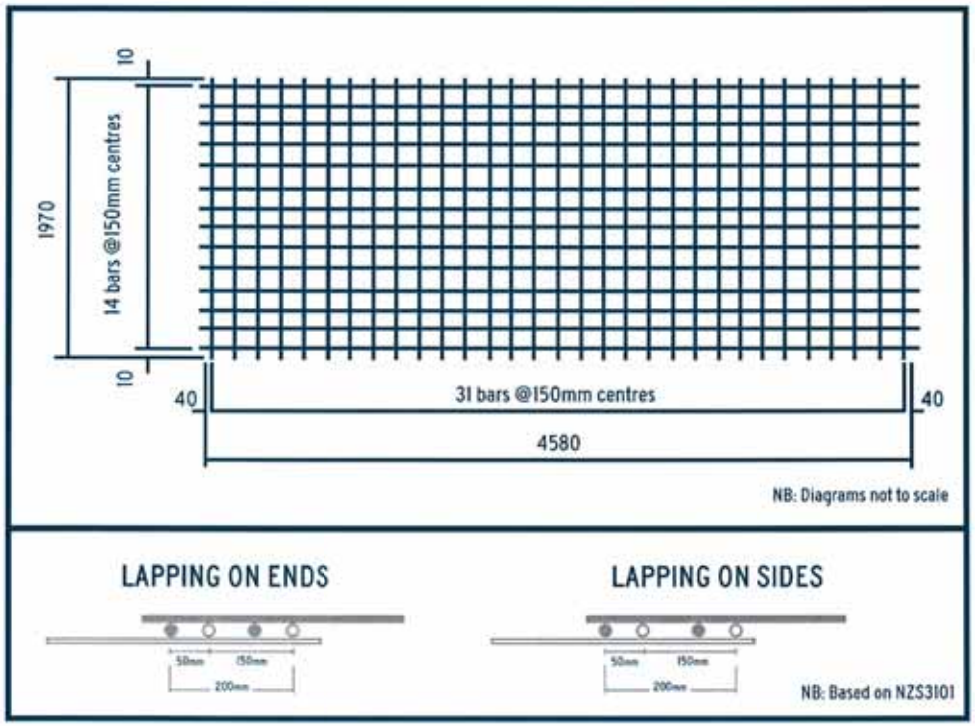
Product Information

PRODUCT CODE	SIZE (M)	CENTRES (mm)	WEIGHT (kg)	WIRE (mm)	NETT COVER (m2)	CROSS SECTION (mm2/m)	EQUIV	COLOUR CODE
SE615-500STD	4.580 x1.970	150	23.38	5.5	7.525	158.31		White

- Each sheet has a pink ID tag with the product code and the batch number printed on it which must not be removed
- 25 sheets per pack
- Minimum order quantities may apply

Dedicated to helping our customers succeed

MESH SPECIFICATIONS



Each batch of product is independently tested for compliance with AS4671:2001 by an independent, third party engineering consultancy Holmes Solutions (www.holmessolutions.com)

Each sheet of EuroSteel SE615 500 Xtra-Ductile mesh has a Pink identification tag attached which details the Euro Corporation product code and the unique batch number relevant to the sheet

This tag should be left on the sheet when it is placed in position to allow easy identification at any time prior to covering with concrete

Batch test certificates are available from Euro Corporation if required

Xtra-Ductile -500E

Specify and use with confidence.

Stock Code: SE 615-500STD

Product Description: SE 615-500 XTRA-DUCTILE MESH (4.58M X 1.97M)

Yeild Stress: ≥ 500 MPA

Uniform Elongation: ≥ 10%

Weight per SQM: 2.490 kg/m²

Nett Cover: 7.525m²

	LONG WIRE	CROSS WIRE
WIRE DIA. (mm)	R5.5	R5.5
CENTRES (mm)	150	150
LENGTH (mm)	4580	1970
NO. OF WIRES	14	31
O/HANG (mm)	40	10
GROSS WEIGHT PER SHEET	23.38 kg	
WIRE kg/M	0.187	0.187
WEIGHT (kg)	11.97	11.40
CROSS SECTION	158.31 mm²/m	
GROSS SHEET AREA	9.02 m²	
CUBIC PER SHEET	0.1 m³	
NO. OF SHEETS PER PACK	25	
PACK WEIGHT	584.41 kg	
PACK CUBIC	2.48 m³	

EUROSTEEL

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