# Research & Development Highlights

Technical Series
90-230

## Construction Problems in Multi-Family Residential Buildings

### Introduction

Many high-rise residential buildings require extensive arid costly repairs while still relatively new (less than 2 years old, in some cases). In 1991, for example, the Ontario New Home Warranty Program (ONHWP) paid out $20 million for repairs to high-rise condominium buildings.

In order to comprehensively document the types, frequencies and causes of problems, Canada Mortgage and Housing Corporation (CMiHC) and ONIIWP developed a computer program to identify the main types of problems and correlate them with corresponding building systems or design and construction practices.

Problem data were obtained from ONHWP's files, which contain information on complaints, confirmation, resolution, and in some cases repair costs. Design and construction details were determined from the buildings' original plans, which were borrowed from the contractor, designer or condominium board. In some cases, researchers also visited the building in person to check on certain details and gain an overall impression of construction quality.

### Findings

The most common complaints were of moisture problems, reported for 36 out of 44 buildings. Moisture problems were found to correlate with poor flashing construction, or with reliance on caulking **to** prevent rain penetration and air leakage.

Other common problems included efflorescence, cracking, drafts, interior staining and corrosion.

Many of the problems reported appeared **to** be the result of poor or inadequate detailing for features such as flashing, cavity size or movement joints.

The study determined from the review of 47 sets of building plans that the vast majority did not provide enough details **to** guide the builder. Where the plans were detailed and comprehensive, the ONHWP files contained few or no problem complaints.

Inspections by designers seemed generally infrequent and probably ineffective as a means of quality control. The insufficient budgets of local building officials limit their focus **to** structural and fire safety only. In addition, since the plans are not complete, it is difficult, if not impossible, for inspectors **to** determine compliance. Another factor in the quality of construction is the contractor's abilities and attention **to** detail. Successful single-family home builders do not necessarily have the skills required for high-rise construction. It may be worth considering different warranty rates depending on the experience and track record of the contractor, or a third-party inspection system.

### Recommendations

• The computer program developed for this study could serve as the basis for a comprehensive data ifie on problems and design and construction details.

Information could be provided by designers, ONHWP and CMHC, and the program could be refined **to** provide a finer breakdown of problems.

• Other public and private building owners should be invited **to** provide problem data so that problems can be studied and minimized by improving original construction procedures.

• The quality of building designs should be improved. Emphasis must be placed on practical education and on production of user-friendly technical information.

• Bulletin 19, "Design and Site Review Reporting," should be implemented, with emphasis on securing inspectors from qualified firms not directly responsible **to** either the contractor or the board. For instance, Technical Audits commissioned by Condominium Boards provided the most detailed identification of problems.

• The National Building Code and the Ontario Building Code should contain requirements for the performance of the building envelope.

• CMIHC and ONIIWP should develop information on remedial measures to correct common problems, along with schedules for normal maintenance and repair. CMHC is also moving to develop assessment strategies and repair/renovation strategies.

• Existing information on effective ways **to** prevent rain penetration and moisture condensation is not being used. CMIHC and ONHWP should continue **to** develop ways to get this information **to** the people who need **it.** CMHC is moving to develop "Best Practice" guides to deal with this, and developing seminars on detailing.

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*Research Report: Construction Problems in Multi-Family Residential Buildings*

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*A full report on this research project is available from the Canadian Housing Information Centre at the address below.*

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