

# **Tower Renewal Guidelines**

**For the Comprehensive Retrofit of Multi-Unit Residential Buildings in Cold Climates**

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**Cover Photo and Design:** Jesse Colin Jackson

**Subject:** Jane Exbury Towers, Toronto, Canada, circa 1969 by architect Uno Prii.

## Disclaimer

The information and procedures presented in this publication are intended to provide guidance to knowledgeable industry professionals experienced in the design and retrofit of multi-unit residential buildings. It remains the sole responsibility of the designers, constructors and authorities having jurisdiction that all work performed conforms to applicable building code and labour safety regulations, and adheres to sound building science principles. These guidelines are not a substitute for prudent professional practice, due diligence and compliance with applicable codes and standards. While care has been taken to ensure the accuracy of information presented herein, this publication is intended solely as a document of building science and architectural intent. This publication should not be relied upon as a substitute for architectural, engineering, or retrofit advice by qualified practitioners. The authors, sponsors and members of the steering committee assume no responsibility for consequential loss, errors or omissions resulting from the information contained herein. The views expressed in these guidelines are those of the authors and do not necessarily represent the views or policies of the sponsors.

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## Foreword

It is a great pleasure for me to write a foreword to the Tower Renewal Guidelines which has been prepared by Professor Ted Kesik, together with his colleague Ivan Saleff, and which includes contributions from a number of other members of the faculty, alumni and students of the John H. Daniels Faculty of Architecture, Landscape, and Design at the University of Toronto.

As noted in the Preface, this work began some years back in a research-based elective course offered by Professor Saleff, who was then joined in his work by Professor Kesik, and he in turn attracted a number of fellow faculty members and students to this important topic of architectural, landscape and urban research. Some of this complementary work is reflected in the contributions to the report by alumnus Graeme Stewart and by Professor Rob Wright.

By now, the influence of this important work has become widespread, and we can see it gradually beginning to influence policies of the City of Toronto and the Province of Ontario. Indeed, the Tower Renewal Guidelines must in my view be seen as one major culmination to this pioneering research investigation. Its ramifications for the future of our urban region are almost limitless, involving social and economic issues, industrial developments strategies, climate change, urban planning and transportation policy, etc.

I extend my deepest congratulations to my academic colleagues here at the Daniels Faculty, Professors Kesik, Saleff and Wright, as well as to the alumni and students who have worked with them on the production of this publication.

George Baird  
Dean, John H. Daniels Faculty of Architecture, Landscape, and Design,  
University of Toronto  
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## Preface

The idea of tower renewal in its broadest sense, and as it is presented in these guidelines, emerged from a series of architectural explorations initiated by Ivan Saleff shortly after the turn of the new millennium at what was then known as al&d, the Faculty of Architecture, Landscape, and Design, University of Toronto. His original elective course was attended by graduate students of architecture, engineering and landscape architecture, who were attracted to the idea of investigating building skin consciousness. Reinforced concrete-frame apartment buildings constructed across Canada, primarily during the 1960s and 70s, became the vehicle for this investigation of how the skin might be renewed to extend the service life of the buildings and to improve their environmental performance. As the course progressed, Ted Kesik examined the technical potential for energy and water conservation improvements, the corresponding reductions in greenhouse gas emissions, and the comparative life cycle costs associated with various renewal strategies.

The potential for improvements was found to be enormous, but one of the most significant findings to emerge from the early research was that these buildings were deteriorating rapidly. Their preservation was only achievable through an encapsulation of the building envelope on the exterior (overcladding), otherwise the precious embodied energy that was invested in the reinforced concrete armature (structural frame) would be lost, along with invaluable housing resources. Exterior retrofits also had the technical advantage of countering thermal bridging and improving thermal efficiency more cost effectively than any type of interior retrofit strategy offering equivalent performance. In terms of financial feasibility, exterior retrofits of the building envelope eliminate the need to displace tenants and this conserves revenues while it minimizes the dislocation of inhabitants.

All of this research and its significant findings paralleled efforts that were underway in continental Europe and the United Kingdom, and so it would appear that there was international consensus on appropriate strategies for the rehabilitation of high-rise, multi-unit residential buildings (MURBs). Subsequent research at the University of Toronto by the authors and their graduate students extended overcladding into the idea of tower renewal as a comprehensive, building-as-a-system retrofit that also opened opportunities for landscape restoration, urban intensification, renewable and district energy systems. Skin consciousness remained the trigger for a raised awareness of issues and opportunities that transcend the technical aspects of tower renewal.

These technical guidelines reinforce the view of housing as an essential resource to be sustained, not a commodity to be traded away, like stocks and bonds. Shelter is a primal necessity for human survival, and along with water and food comprise basic requirements for physical existence. Shelter, regardless of origin or form, is a critical driver of human advancement. Primitive shelter focused upon security and protection from the elements, whereas modern housing implies attributes and relationships that address the social, psychological and ecological connections between buildings and their inhabitants. Contemporary housing design criteria are of a high level of complexity, reflecting the modern condition and its expectations. In addressing these housing design challenges, it must be recognized that the essential “primitive” requirements for sustainable shelter cannot be compromised. Issues such as intergenerational equity necessarily emerge from this perspective to inform not just how we must rehabilitate our existing housing stock, but also how we must design our new buildings so that the future process of renewal is not compromised by outdated attitudes towards economics, ecology, technology and culture.

The tower apartment buildings that are the focus of these guidelines reflect a technology that corresponds to what in the future may be seen as the juvenile stage of our affluent, industrial society. Now that we are migrating towards a post-industrial society that inevitably will be forced to adapt to a post-carbon global culture, it is important to realize that static building systems are obsolete. These guidelines propose overcladding systems that have a maximum useful service life of 50 years, and may be easily replaced after they have expired. The critical environmental control layers and/or cladding attachment members should remain intact and serviceable for several cycles of cladding replacement. Accessible raceways and chases may also be incorporated into this new skin for the integration of building services and future ease of replacement or upgrading. The intent is to convert static, industrial era building technology into a biological model of a durable armature housing vital organs protected by a renewable skin. This anthropomorphic approach is consistent with the prosthetic function of buildings as an extension of human physiology.

This approach to tower renewal also gives cause to reassess the modus operandi of contemporary development, architecture, engineering and construction. If buildings are prosthetic interventions intended to enable human survival, then this implies a life cycle that mimics the creatures they shelter. “Green” movements have come and gone, reinvented periodically as a function of the fluctuation in energy costs and economic climate. The current movement, if sustained, will offer benefits enjoyed by many generations to come. Tower renewal will be a leading barometer of our collective will to mend the path to a sustainable future.

For all living things, there is but one alternative to renewal, and the same holds true for the artifacts that support living things. Tower renewal represents a single thread in the evolving tapestry of our built environment. Running along its weft are the eternal rhythms of civilization in all of their cultural dimensions. These human needs and desires intersect the ever changing warp of ecological carrying capacity, environmental impacts and the economic consequences that emerge as these intertwine. Weaving alongside tower renewal will be the revitalization of all the other building typologies and the municipal, transportation and energy infrastructure that now struggles to support them. The realities of the 21<sup>st</sup> century are demanding that we abandon a culture of conspicuous consumption and re-discover a reverence for cultivation and conservation. Adaptive renewal remains the only means to unfetter future generations who will otherwise inherit dysfunctional building technologies that tether the human imagination and diminish the earth.

This publication is a collaborative, interdisciplinary effort aimed at dealing with the regeneration of Canada’s tower housing stock. There is much more effort needed to realize tower renewal and extend it to other building typologies. It is hoped this modest beginning will inspire others to take up the challenge of maintaining the vitality of our built environment, so that is not a liability but a legacy to future generations.

Ted Kesik and Ivan Saleff  
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