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A Study of Crime Prevention Design Performance for the Built Environment

- Focusing on the Development of Crime Prevention Evaluation Criteria for Apartments or Multiple Dwelling Units -

Introduction

The built environment is considered to have major places susceptible to violent crimes such as rapes or forced indecent acts. To deal with such criminal acts, relevant researches and institutional frameworks for the prevention of potential crimes in the built environment have been under consideration focusing on apartments. While apartments or multiple dwelling units, comprising 17% of the total of residential structures in 2015, are prone to occur crimes because of the nature of their architectural features, they have been subjects to low consideration in the field of crime prevention environmental designs. This study has been carried out to develop performance evaluation criteria for crime prevention designs for apartments or a multiple dwelling units, which have steadily increased in construction since 2010, and to suggest practical applications of the criteria.

National status of violent crimes in buildings (2012~2013)

Classification	2012		2013		Total	
	Number of occurrences	Ratio(%)	Number of occurrences	Ratio(%)	Number of occurrences	Ratio(%)
Buildings	12,009	47.8	15,972	59.2	27,981	53.7
Exterior space of buildings	4,728	18.8	8,773	32.5	13,501	25.9
Others	8,412	33.4	2,217	8.2	10,629	20.4
Total	**25,149**	**100.0**	**26,962**	**100.0**	**52,111**	**100.0**

※ Buildings include apartments, multi-family houses, multiplex houses, single houses, department stores, supermarkets, convenient stores, large discount stores, shops, accommodations, bathhouses, night clubs, offices, factories, warehouses, stations, waiting rooms, schools, financial institutions, medical institutions, religious institutions, public restrooms, and Internet cafés.
※ Source: Crime occurrence place (2012, 2013) in Open Data Portal

Single and public house building status and numbers of crimes in 2014

Classification	Gross Floor Area (100,000m^2)	Numbers of building (1,000 buildings)	Numbers of crime[3)] (numbers)	Numbers of crime per 100,000m^2 (Case numbers/100,000m^2)
Single House[1)]	4,804.35	4,150	38,232	7.96
Public House[2)]	11,198.76	384	33,777	3.02

※ Note 1) Includes single, shared, multi-family houses.
Note 2) Includes apartments, row houses, and multiplex houses.
Note 3) Includes violent crimes, theft, and violence.
※ Source: Data of unit numbers, gross floor area, building numbers from the building register (as of December, 2014); Crime Statistics (2014), pp.358~61., Korean National Police Agency (2014).

This study has been divided into 3 stages. First, most of the available criteria applicable to apartments or multiple dwelling units have been brought up together through domestic and foreign case analyses of policies and authorizations associated with the crime prevention designs of buildings. Second, the evaluation criteria of crime prevention designs fit for apartments or multiple dwelling units have been selected through site examinations and expert interviews. Third, a weight value for each evaluation criteria has been calculated by applying AHP analysis on expert questionnaires. Fourth, a final evaluation criterion of crime prevention design has been established through case applications. Fifth, a scheme to apply the crime prevention design to apartments or multiple dwelling units is proposed for both the public sector and the commercial sector.

Case Analyses of Performance Criteria of Crime Prevention Designs of Buildings

With the recent growing awareness of the level of crime prevention environmental designs in countries around the world, the application of policies and institutional arrangements boosting crime prevention designs and security alarm systems have increased. This study covers four cases: British SBD (Secured by Design), the Quality Security Mansion System

of Japan, the CPTED Authorization by the Korea CPTED Society, and the Outstanding Crime Prevention Building Authorization by the City Government of Seoul. The British SBD Homes Authorization Program initiated by a police organization is primarily comprised of an architecture design, a security system, and more for other areas. The Quality Security Mansion System of Japan, an Integrated National Certification System, distinguishes mandatory and recommendations for certification, and individual requirements which lay out certification item for common use and exclusive space. The CPTED authorization items, applied to the evaluation on "Regulations and Manual for Crime Prevention Environmental Design Authorization" governed by the Authorization Committee under the Korea CPTED Society, consist of five evaluation areas covering common use space, half-common user space, half-private space, common facility criteria, and specialization strategy and design. The authorization items, prepared by the city of Seoul, are to be applied for outstanding building crime prevention to foster a secure architectural city environment against criminal activity and consist of external environment, architectural structure, crime prevention facilities, operation and maintenance, and residential activities.

British SBD Homes

Quality Security Mansion System of Japan

CEPTED Authorization by the Korea CPTED Association

Outstanding Crime Prevention Building Authorization by the City Government of Seoul

The Development of Crime Prevention Design Performance Evaluation Criteria for Apartments or a Multiple Dwelling Units

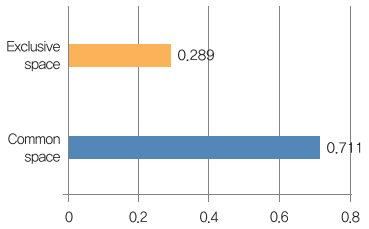
The selection process of crime prevention design performance evaluation criteria follows three stages. First, the items contained in three or more categories out of the four domestic and foreign crime prevention design performance evaluation criteria are selected separately for common use spaces and exclusive use spaces. Second, crime prevention design performance evaluation criteria have been drawn up through field surveys and expert questionnaires, and are applied to calculate a weight value for each evaluation item as indicated in the AHP. Third, crime prevention design performance evaluation criteria have been finalized after an adjustment incorporating the experiences of applying exit criteria to the multiple dwelling unit located in Garibong-dong, Kuro-gu of Seoul.

Crime prevention design performance evaluation criteria for a multiple dwelling unit

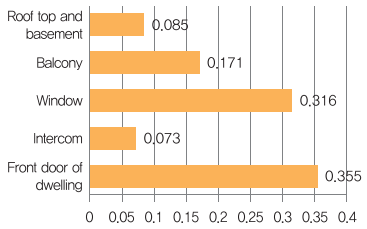
Classification		
Common space	Common use entrance	Located in a place securing a view from the road and public footpath or adjacent building
		Install an entrance door equipped with an automatic locking system
		Install a security camera
		Install a motion sensitive light
		Remove recessed area near the common use entrance so it cannot to be used by people for hiding
	Separating space and outdoor piping system	Install an access control system in the space separating buildings
		Install a lighting system on the boundary of wall and buildings facing the road and public footpath
		Install outdoor piping adjacent to the dwelling window or common use window in the place to secure a clear view from the road and public footpath
		Outdoor piping should be buried or covered
		Install an electric use meter and gas meter in the external common use space of a dwelling
	Common use hallway and stairway	Should be designed to prevent an invasion from the common use hallway and stairway into any dwelling (balcony etc.)
		Install a motion sensitive light
		Install a window to provide observation of inside/outside
	Parking lot and piloti	Located in a place securing a view from the road and public footpath or from the adjacent building
		Install a security camera
		Install a motion sensitive light
	Landscaping and green area	Construct the place to secure a view from the road and public footpath, common use entrance, or adjacent building
		Spaced to prevent invasion from the window of a dwelling, etc.
		Allow 50-70cm for shrubs and more than 2m for trees
		Space tree crowns more than 1.5m from a building
Exclusive space	Front door of dwelling	Install a door and locking system compatible with security test standards
		Install a door guard and auxiliary locking system
		No installation of a milk drop slot in the lower part of a front door of a dwelling
	Intercom	Install an intercom with an outside view of the dwelling entrance and communication on the line
	Window	Install a sash, window, grill, or locking system tested by security performance standards
	Balcony	Located in a place not accessible using the stairway handrail
	Roof top and basement	Install an access control system such as an emergency automatic door control system

※ Evaluation criteria items in bold are part of the top 10 priority items.

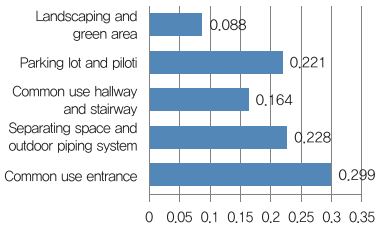
AHP Analysis results: Importance of each space in a multi-family and multiplex unit



Analyses results of the importance of exclusive and common space



Analyses results of the importance of each space for exclusive space



Analyses results of the importance of each space for common space

Activation Plans to Apply Crime Prevention Designs for Apartments/Multiple Dwelling Units

The activation plan to apply crime prevention designs is suggested separately for public sector-led pilot projects and associated projects with a regulatory reorganization and promotion to encourage private sector participations. From the public sector perspective, a networking strategy to associate central government controlled projects and local government controlled projects to facilitate pilot projects focused on priority areas for crime prevention is suggested, which would involve regulatory reorganization, leasing projects for remodeling LH dwellings, supporting projects for housing for the poor, and urban restoration project. Furthermore, a quality class system for multiple dwellings is presented to reinforce the design performance for crime prevention in multiple dwelling units.

From the private sector perspective, various systematic arrangements to apply crime prevention design criteria for multiple dwelling units located in areas prone to crime are proposed, which would involve the implementation of legislation making the application of the criteria mandatory, incentive mechanisms for administrative and financial terms, excellence housing awards and the reinforcement of security recommendations contained in the system of multiple dwelling units.

Conclusion

This study would be significant in the development of objective criteria to evaluate crime prevention design performances through the analysis of domestic and foreign policy effectiveness of crime prevention environmental designs, interviews and surveys with experts in architecture, urban studies and CTPED, and particularly through field surveys and assessments in population densed areas. In addition, practical suggestions for networking strategies to associate public projects and activation plans to facilitate private sector participation will help to secure practical effectiveness in implementation process and in the evaluation process.

Contribution of this study would be as follows. First, the suggestions and results would be considered for the central government as a background to improve relevant law and regulations associated with a building crime prevention. Second, the results of this study would contribute for the local government to provide reasonable backgrounds for ordnance reorganization and securing the required budget to implement policies to link central and local projects. Third, the private sector would expect an improvement in the sense of security, an increase in real estate values and rental rates, and accessibility to administrative and financial support by adopting crime prevention designs and improved security systems.

Further research would be needed in the indepth fields on the maintenance of laws and regulations on crime prevention for multiple dwelling units, the development of a design manual for crime prevention for each type of multiple dwelling unit, the application of crime prevention environmental designs in the licensing process for multiple dwelling units construction, and a performance analysis of crime prevention environmental design projects.

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