IOP Conference Series: Materials Science and Engineering • *Open Access* • Volume 615, Issue 1 • 15 October 2019 • Article number 012034 • 7th International Conference on Euro Asia Civil Engineering Forum, EACEF 2019 • Stuttgart • 30 September 2019through 2 October 2019 • Code 153104

Document type
Conference Paper • *Bronze Open Access*

Source type
Conference Proceedings

ISSN
17578981

DOI
10.1088/1757-899X/615/1/012034

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Managerial flexibility role on financial investment analysis: A case study of public housing

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Reaxys Chemistry database information
Indexed keywords
Sustainable Development Goals 2023
SciVal Topics
Metrics
Funding details

Abstract

The limitations of Discounted Cash Flow (DCF) method for capturing the opportunity value phenomenon in the uncertainty of housing investment analysis cause difficulties in the decision-making process for the investors. Flexibility factor becomes the obstacle for investors in project uncertainty. Real Options Analysis (ROA) is an important factor included in the DCF method because it offers managerial flexibility in the uncertainty of housing investment decision making. Flexibility in ROA is a right and investors do not have an obligation to respond to uncertainty in project investment. In this research, the type of flexibility on ROA used is an option to carry out promotional activities. The

Source details

IOP Conference Series: Materials Science and Engineering

Scopus coverage years: from 2009 to 2021

(coverage discontinued in Scopus)

ISSN: 1757-8981 E-ISSN: 1757-899X

Subject area: Engineering: General Engineering | Materials Science: General Materials Science

Source type: Conference Proceeding

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Managerial flexibility role on financial investment analysis: a case study of public housing

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Abstract. The limitations of Discounted Cash Flow (DCF) method for capturing the opportunity value phenomenon in the uncertainty of housing investment analysis cause difficulties in the decision-making process for the investors. Flexibility factor becomes the obstacle for investors in project uncertainty. Real Options Analysis (ROA) is an important factor included in the DCF method because it offers managerial flexibility in the uncertainty of housing investment decision making. Flexibility in ROA is a right and investors do not have an obligation to respond to uncertainty in project investment. In this research, the type of flexibility on ROA used is an option to carry out promotional activities. The research results indicate that promotional activities affect the increase in Net Present Value (NPV) so that the benefits are maximized. Comparison of the results of investment analysis between ROA and DCF methods indicates an added value due to the existence of such flexibility. The investment simulation of ROA method was conducted using Monte Carlo method approach. The role of flexibility from the simulation is obtained by increasing the added value by 5.2%, and optimal promotion occurs in the first two years of investment.

1. Introduction

Indonesia is the 4th largest population in the world, with a total population of 261 million in 2016. According to data released by National Planning Body (*Bappenas*), in 2015 there was a gap between the number of houses built and the number of houses needed by Indonesian people (backlog) by 11.8 million units [1]. The government has One Million Houses Program agenda to provide 1 million houses each year and provide subsidies for 1.75 million new housing units. Therefore, investment and development of low-cost housing in Indonesia in the future will be greatly needed, both by the central government, regional governments, and even the poor.

Warsito [2] found that low-income people still had difficulty buying affordable houses. The realization of low-cost housing policies is still not fully enjoyed by these low-income people. The issue of low property prices in Indonesia still faces the highest loan interest rates. The realization of low-cost housing construction in Indonesia in the 2010-2016 period only reached 26.31 per cent [1]. These conditions affect the lack of interest in home property developers to build affordable housings for the poor. Other causes are the minimum limits on the type of house and plot area, expensive licensing fees and document management and the availability of land for the location of the affordable

IOP Conf. Series: Materials Science and Engineering **615** (2019) 012001 doi:10.1088/1757-899X/615/1/012001

Implementation of a disaster management system for local governments in Japan

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Abstract. Reconstruction after the Great East Japan Earthquake in March 2011 has been delayed. To suitably respond to similar large-scale disasters in the future, the implementation of a disaster management system at the local municipal level, aimed at rapid reconstruction that includes management of processes from pre-disaster to the reconstruction phase, is required. In this study, we develop a prototype of such a system, which is referred to as the Local Government Disaster Management System (LGDMS). For our study, we collaborate with a municipality in Kochi, Japan. In the LGDMS prototype, we use a Work Breakdown Structure (WBS) format, wherein the contents of each activity and roles of different organizations in those activities are defined based on a study of organizational problems and law and regulation issues among the central government, prefectural governments, and municipal governments. The Construction Management Committee of the Japan Society of Civil Engineers (JSCE) established a subcommittee for this research. This subcommittee is composed of university faculty members, local consulting engineers, and administrative officials in Tohoku and Kochi. The subcommittee is striving to implement LGDMS in several municipalities in Kochi.

1. Introduction

After the Great East Japan Earthquake in 2011(GEJE), disaster management including pre-disaster planning, rescue operations, recovery efforts, and reconstruction became a priority in Japan. Disaster management efforts focused specifically on municipal governments being at the forefront when any kind of disaster is occurring. Kakuzaki et al [1] summarized necessary activities and procedures of the activities for each aspect of disaster management. A management system which includes WBS (work breakdown structure), the contents of each activity, and work sequence to facilitate rapid and efficient recovery for any phase was developed in the research. It was named Disaster Management System. Researchers developed a prototype of the system for rural municipal governments in Japan, which they called the Local Government Disaster Management System, or LGDMS.

Any existing plans of rural municipal governments such as disaster prevention plans, debris disposal plans, temporary housing construction plans, evacuation plans, etc., successfully address damage predictions such as number of fatalities, number of collapsed buildings, amount of debris, etc. However,

IOP Conf. Series: Materials Science and Engineering **615** (2019) 012003 doi:10.1088/1757-899X/615/1/012003

Thermoelectric district supply concept including e-mobility

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Abstract. The main objective of the environmental protection is the sustainable energy supply of residential areas. This is made possible by networking several buildings in the same district in order to produce a sustainable, efficient and self-sufficient supply of electrical and thermal energy. The second elementary topic is the conversion from combustion engines to electric mobility, i.e. from thermal to electrical energy. A novel concept of networking different storage facilities, energy producers and consumers will enable a sustainable, self-sufficient energy supply for districts. A special feature of this energy management design is networking of electrical and thermal systems with subsequent integration of electro-mobility into the districts plant system. Energy consumption and energy generation were simulated in an exemplary project of a district containing three new low-energy buildings. The results show that a self-sufficient supply of this district is possible with intelligent control of charging cycles and charging capacity and with the use of a new storage facility for electrical energy - a Compressed Air Energy Storage system. This model concept makes not only a considerable contribution to the electro-mobility conversion, but also enables an energy-efficient and sustainable electrical and thermal supply of the district.

1. Introduction

Sustainability and environmental protection are two elementary objectives of modern society. In order to achieve an energy-efficient and self-sufficient energy supply for districts, intensive networking of the individual buildings and control of the various components is implied. For this purpose, a concept based on networking and self-sufficiency was developed on the Institute for Materials in Civil Engineering at the University of Stuttgart. It combines thermal and electrical subsystems of plant engineering equipped with a Compressed-Air Energy Storage (CAES) technology. As the politics in the automotive industry currently show a descending trend toward the CO_2 emission reduction, a further goal would be therefore to switch to integrated electro-mobility concept in the residential sector. This is only efficient and sustainable if the required power would be generated from renewable sources. The present concept integrates electro-mobility into the system scheme and serves as a modular, universally applicable approach for the energetic supply to district typologies of different sizes. It is based on intelligent planning through simulation, networking and control of different generators, storage facilities and consumers.

The developed district networking concept is based on an intelligent distribution and the temporal shift of the generated power by means of electrical and thermal storage. It is designed under three main assumptions: (I) the parking spaces in the district are designed as electric vehicle (EV) parking spaces, (II) the self-sufficient energy supply of these parking spaces is made possible through electrical energy

IOP Conf. Series: Materials Science and Engineering **615** (2019) 012005 doi:10.1088/1757-899X/615/1/012005

Effects of w/b ratio, fly ash, and chloride content on corrosion of reinforcing steel

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Abstract. To predict the corrosion of reinforcing steel, the electrochemical properties of reinforcing steel with different concrete mix proportions and chloride content were studied. The water to binder ratio of concrete was varied (0.45 and 0.60). Coal fly ash was used to replace OPC (0 and 30% by weight of the total binder). The initial chloride was 0, 2, and 4% by weight of concrete. Potentiodynamic polarization testing was conducted by controlling the moisture of specimens. The Tafel slope, corrosion potential, and corrosion rate were analyzed from the testing results. Results show that chloride content significantly affects the electrochemical properties of reinforcing steel. The anodic Tafel slope decreased as chloride content increased. The cathodic Tafel slope increased when the water to binder ratio decreased, or when the fly ash content increased due to a denser concrete pore structure, limiting oxygen diffusion. Results from this study can be used to simulate the corrosion of reinforcing steel and predict the service life of reinforced concrete structures. Also, the electrochemical compatibility between existing and repaired sections can be evaluated to ensure the durability of repaired RC structures.

1. Introduction

The corrosion of reinforcing steel (RC) is a major problem, deteriorating reinforced concrete structures worldwide. To ensure the safety of an RC structure throughout its service life, performance prediction must be accurately performed. For the corrosion of reinforcing steel, the deterioration mechanism is normally classified into 4 stages: corrosion initiation, corrosion propagation, corrosion acceleration, and deterioration. In each stage, different prediction models are required. For example, corrosion initiation due to chloride attack or carbonation can be predicted based on Fick's 2nd diffusion law. After corrosion has been initiated, the time to corrosion cracking can be predicted based on the corrosion rate of reinforcing steel and structural conditions such as concrete strength or the location of the reinforcing steel. Many researchers studied the corrosion rate of reinforcing steel [1]. It is well known that the corrosion rate depends on concrete properties such as chloride content, pH, moisture, oxygen, temperature, electrical resistivity, etc. In previous studies, the corrosion rate was measured by corrosion mass loss, embedded corrosion sensors, linear polarization, half-cell potential, or electrical resistivity. Equations to predict the corrosion rate has been proposed.

IOP Conf. Series: Materials Science and Engineering **615** (2019) 012010 doi:10.1088/1757-899X/615/1/012010

Quantitative assessment of interfacial condition of cold joint using surface wave group velocity profile

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Abstract. Improperly constructed cold joints lead to poor water tightness. Water, chloride ions, and other harmful substances can therefore enter through the joint, causing the accelerated corrosion of steel bars. In this study, the surface wave group velocity profile, which can identify velocity at variant depths beneath concrete surfaces, was used to determine the interfacial condition of a cold joint. The proposed test method performed a single test with one impacting source and one receiver placed on a concrete surface across the joint. The short-time Fourier transform (STFT) and the reassignment technique were used to process the received signal and obtain the image of the group velocity spectrogram. The surface wave group velocity profile was then extracted from the spectrogram. A 0.4 m-thick reinforced concrete wall containing a cold joint was constructed for the experimental studies. The experimental results revealed a sudden decrease in wave speed for wavelengths larger than 0.2 m: the Rayleigh wave speed dropped from 2,000 m/s for normal concrete to 1,300 m/s for concrete including a cold joint. These results suggest that the rebars near both sides of the wall surface constrained the joint from separating up to the depth of 0.1 m; however, a poor interfacial condition was found near the center of the wall.

1. Introduction

Cold joints form on the interface of two concrete batches when the previous batch of concrete has begun to set before the subsequent batch is added. The poor water tightness of cold joints leads to the invasion of water, chloride ions, and other harmful substances and thus causes the accelerated corrosion of steel bars [1]. In addition, literature confirms that the presence of cold joints can produce a significant decrease in the flexural strength, tensile strength, and compression strength of the concrete [2–7].

Can a pour line of uneven color found on the surface of a wall or beam be considered a harmful cold joint? Sometimes the formation of the casting line can cause narrow spacing between the steel reinforcement and the wall of the formwork, even when the concrete is well mixed inside. In that case, although the surface appears to have a clear casting line or honeycombs, the core drilling results along the casting line indicate no reduction in strength, which means that only surface waterproof treatment is needed [8].

How can one distinguish cold joints from non-cold seams? Experienced engineers in the United States use one of three methods [8]: The first requires obtaining a core sample with a pouring line and performing a careful visual inspection on it. A seam will not be considered a cold joint if the layered interface line does not extend deep into the seam, or the distinguishing stratified layers continue to the