# 23

Since the compensable use system of state-owned land came into effect in China, land auction—land tender, listing, **or** auction—has gradually become the main supply form of state-owned land, in company of the frequent phenomena called "land king", which represents the extremely high price of urban land. This paper starts with "land king" and discusses the micro mechanism of how "land king" as price signal influences **future** land market. Based on prospect theory and auction theory, this paper analyses how governments, the sellers, and enterprises, the buyers, react in **land auction** after "land king" events. Further, using **micro data** from 35 cities in China, this paper conducts empirical research to test how governments and enterprises change their behavior after "land king", in **application** of event study. It is showed in the research that "land king" events **will** significantly affect the reserve price and auction type chosen by governments and the bidding behavior of enterprises. Furthermore, the **different** behavior of governments and enterprises after "land king" **between** different auction forms proves the hypotheses of prospect theory, that "reference dependence" of governments and enterprises exists in land auction, and that "land king" events will influence **behavior** of governments and enterprises in land auction by changing their risk attitude.

# 24

In this research, virtual reality technology (VR) is used to build the "coin museum" model in virtual reality. We set up the spatial cognitive task under different cognitive modes using the method of experimental psychology. The fire evacuation process **is** simulated at the same time. We designed the experimental task script to connect the spatial cognitive process and the fire evacuation process, to find the index system to evaluate the decision-making ability of the subjects, and finally established the experimental psychology research paradigm.

We invited the subjects to wear VR external equipment for space psychology cognitive experiments, asked them to fight the fire evacuation task and **complete** the escape after completing the cognitive task. We **have** recorded the subject's choices in the experiment, response time during the process of completing the task, the subject's emotional score, the score of sense of direction, the score of the strategy to seek the way, and the anxiety score. After collecting these statistics, we use SPSS data analysis to find out the rules behind.

The innovation of this research is to combine spatial cognition with fire evacuation. Previously, the spatial cognition was studied under normal conditions. The results of this study **will** be in the state of fire stress**,** there are some conclusions on the spatial cognitive model to verify. At the same time, by setting different spatial cognition patterns, we can analyze the factors that influence the behavioral characteristics of the fire evacuation process in the space cognitive process**,** guide the evacuation management of the fire**, and** the evacuation training before the fire. **Find** out the way to improve people's behavior in the path decision-making level during the fire.

# 25

Concrete-filled double-skin steel tube (CFDST) has a wide range of applications in engineering as a new type of steel-concrete composite structure. It has been used in electricity poles and transmission towers, and has a great advantage in the future application in high-rise **structure**. However, there is no experiment about the bond-slip relationship between steel and concrete of the concrete-filled double-skin steel tube. Researchers just refer to the bond-slip relationship of concrete-filled steel **tube** and take conservative **approach**. In this thesis, the experimental data of the interface properties of concrete-filled steel tube (CFST) **have been** collected and analyzed, and the formula of bond strength is fitted. At the same time, the **pushu**-out test of 72 concrete-filled double-skin steel tubular members **are** conducted. The parameters include the **diameter to thickness** ratio of steel tubes, the hollow ratio of the cross section, the roughness of steel tube surfaces, the shrinkage of concrete, size effect and the **length to diameter** ratio. The results show that the bond strength of the interface between the outer steel and concrete is similar to that of the concrete-filled steel tube, and the bond strength between the inner steel and concrete is generally higher than that between the outer steel and concrete.

# 26

Traffic network is a major part of civil engineering and daily **live** of citizens and is vulnerable to natural hazards. The post-hazard traffic condition is the basis of rescuing **process** and other emergency actions.So, we should understand and simulate the post­hazard traffic condition and consider taking optimal action to mitigate traffic congestion **post-earthquake**.Meanwhile because of the **no-notice** occurrence of earthquake event the **the** traffic behaviour post-earthquake is complex, **leading** by the physical damage of traffic network and **following** by the traffic mode change.

This paper first reviews researches about post-earthquake traffic network **condition**. Then, **This** study develops a scenario-based methodology to model the performance of traffic network immediately after the earthquake by agent-based model, in which the abrupt change of **traveler' s** destination, the behavior irrationality of drivers, the traffic information availability and the impairment to traffic capacity due to bridge damage and building debris are accounted for in real-time modelling. Finally, we use the real data of Tangshan City to analyse and compare the traffic condition under different situations. The modelling results suggest that the methodology can capture the traffic flow characteristics immediately after **earthquake** and can be used to evaluate the performance **the traffic network** under emergency **situation**. The analysis shows if the government **take** active action to build real-time traffic condition share **system**, it can bring great improvement to the traffic recovery post-earthquake **and** which benefits the rescuing and medical system a lot. At the same time, if the government **give** more efficient earthquake education to citizens to keep citizens calm post-earthquake, **the** traffic congestion can also be mitigated.

# 27

Concrete-tilled steel tubular (CFST) structures have been widely used in high-rise**,** super-high-rise buildings and bridges due to their good mechanical properties and construction performance. In this paper, the axial compressive mechanical properties of circular CFST members are investigated. The influence of welding residual stress and initial stress of steel tube **as well as** long-term load have been considered in the analysis to simulate the construction issues in real-life engineering practices. The main content and the outcomes are summarized as follows:

I. Based on the general finite element software ABAQUS platform, a three-dimensional finite element analysis (FEA) model of circular CFST member under axial compression was established, the accuracy of which has been verified with existing test data**.**

2. To understand the influence of welding residual stress, initial stress and long-term load on the axial compression performance of CFST, the FEA model was used to analyze the mechanical properties of axial-compressing CFST members with the different construction issues incorporated. The load-deformation relationship, the interaction and load distribution between the steel and concrete as well as the development of material stress were presented and analysed in the study.

3. Furthermore, a parametric analysis was carried out to study the influence of the different construction issues on the structural performance, including the parameters of initial stress coefficient, long-term load ratio, section steel ratio, steel yield strength and the concrete strength. The results of this analysis could be used as **reference** for the calculation of the axial bearing capacity of CFST members with the influence of welding residual stress, initial stress and long-term load considered.

# 28

Human factors, especially driving behavior, are the main cause of traffic accidents. Most **of** traffic accidents occur at the intersection of urban roads and during the yellow light. Therefore, it is imperative to study the driving behavior of the yellow light at the intersection**,** and to carry out the risk quantification on the basis of this.

We **chose** **the** straight-line vehicles which **near the parking-line** and need to make **decision** as examples. The study analyzes the driver's decision-making process, and divides vehicles by the distance of the vehicle from the parking-line.

Driving decision (through the intersection or stop) model and acceleration model are created and validated with video capture data. We **found** that with a car in front, **driver's decision** is more aggressive and more likely to be through the intersection, and decision **error-value** is greater.

On the basis of this, the risk quantification research is carried out by calculating the probability of collision and rear-end collision at the intersection.

# 29

Islands in **South China Sea** are in **great scarcity** of building materials but rich in coral reef resources. Therefore, to promote the construction of those islands, using coral reef and coral sand as aggregate for the preparation of concrete is of great significance. Based on the material properties of coral, the mixture proportion design and optimization of LC30 and LC50 coral concrete are carried out and the mechanical properties and durability of coral concrete are systematically studied. This paper also **explored** the rules of coral concrete under uniaxial compression and triaxial compression, and **established** the corresponding constitutive relation model.

# 30

Dam-break disasters occur frequently in China, causing enormous losses of life and economy. In order to minimize damage, it is of great importance to predict dam-break flow by experimental and numerical researches. This paper presents an experimental study on the interaction between dam-break flow and pyramid-shaped obstacles downstream. The propagation of dam-break flow and topographic evolution over fixed and erodible humps in a horizontal open channel with different depth in **reservoir** and irregular topography were simulated. The PTV system using for measuring surface velocity was upgraded for unsteady flow. The water level data was obtained by pressure sensors. Well repeatability was verified. Dam-break flow behavior and basic law causing by abrupt change of topography were effectively described in this paper. In the experimental group with erodible topography, a 3-dimensional laser scanning technique was adopted to measure the ultimate shape and distribution of sand thickness. Furthermore, a SWEs model basing on an explicit TVD-MacCormack difference scheme was used to simulate dam-break flow. Comparison between computed results and experimental data **shows** good agreement about **characteristic** of water level variation. This numerical model was proved to be of good capability **on** predicting the tendency and amplitude of water level variation.

# 31

In the context of global warming, the change of seawater temperature has become a hotspot in climatology and oceanography. Due to its special geographical location, the South China Sea has become a competitive place for China's national development strategy. Therefore, the characteristics of **natural environment**, especially the sea surface temperature trends have become the focus of the Chinese scientists' attention. In this paper, the trend of sea surface temperature in the South China Sea is analyzed by using the trend coefficient, empirical orthogonal function decomposition and empirical modal decomposition method. The sea surface temperature in the South China Sea is analyzed in detail from **year** 1979 to 2016. **Air temperature field** and wind field are analyzed as two aspects of the main factors affecting the temperature of the sea. The results show that the sea surface temperature of the South China Sea over the past 30 years had a significant warming trend with warming **rate** of 0.12°C /10a. However, there are significant differences between the trend **of** shallow and **deep sea** waters. There are obvious cooling trends in the shallow sea waters in winter months, mainly in the northern bay and southeast coastal areas. The air temperature is the main factor affecting sea temperature change, and the wind field also has a significant effect on sea surface temperature.

# 32

The Fengman Dam is located on the Songhua River in Jilin Province, China, and is a comprehensive large-scale hydropower station with integrated multiple functions of power generation, water storage, irrigation and so on. Due to the fact that Fengman Hydropower Station was constructed during a special historical period, the design and construction of the dam itself **has** many flaws. Despite the subsequent repairs, there are still many inevitable security risks which are **difficulty** to solve. Therefore, the old Fengman Dam is to be removed, while the new dame to be built at about 120m downstream.

This thesis studies the removal scheme of the old Fengman Dam, and further analyzes the effect of the old dam blasting on the new dam by the finite element model.

(1) A blasting scheme **is** proposed. This scheme gave the concrete different blasting methods based on the different dam sections that the old dam **need** to burst open. For instance, we adopted partition blasting **method** to demolish the gravity dam section, due to its large blasting volume and the effect from the longitudinal joint. Meanwhile, we chose to directly burst to tear down the overflow dam section because of its smaller volume than others.

(2) The large-scale commercial finite element simulation software ABAQUS was used to establish the finite element model. For the three dam sections, the effect of the old dam blasting demolition on typical point positions of the new dam was studied under the designed condition of explosive charge of each blasting. Using equivalent load **method** to simulate the vibration wave generated by the demolition of the old dam, and taking the influence of the air shock wave into account, we can get the vibration speed of each typical point. The results show that the old dam won't cause any impact on those typical points of the new dam under existing **condition** of explosive charge of each blasting, which means the new dam can operate safely.

The blasting scheme proposed for **gap** in old **dam** and the effect analyzed of the old dam blasting demolition on the new dam involved in the paper have a certain reference for final dam blasting **project**.

# 33

In this paper, a series of centrifuge model tests of the slope with a smooth planar bedrock, a rough planar bedrock **or** a cambered bedrock were conducted, on the basis of the design and machining the bedrocks of two kinds of shapes and two kinds of **roughnesses**. There were three kinds of failure modes of the slope with a bedrock according to the analysis of the centrifuge model tests: sliding along the bedrock, failing inside the soil, and their combination. The sliding along the bedrock significantly decreased the stability of the slope with a bedrock. The slope with a bedrock of different failure modes exhibited different deformation behaviors. The combination of the shape and roughness of the bedrock significantly changed deformation behavior of the slope, and thus led to different failure modes, and finally changed the shape of the slip surface and stability level of the slope.

# 34

Most airports are large space buildings with light envelopes and multiple entrances. For those with all-air **system**, vertical temperature stratification and excessive air leakage are serious problems in winter. Controlling air infiltration is the key to **reduce** **the** heating energy consumption and improve the thermal environment of terminal buildings in winter. Due to the lack of suitable testing method, the air-infiltration data of terminal buildings are lacking.

This paper represents a method to measure natural air infiltration in the airport based on CO2 mass balance and energy balance where CO2 is used as tracer gas to calculate the **airflow** rate and the result is verified by energy balance. A case study is conducted in a 120,000m2 airport in **north** China in winter. The result shows that in a typical day in the heating season, the heat taken away by unorganized infiltration accounted for 56% of the total heat loss. In addition, the result of fluid dynamics simulation **found** that, for terminal buildings with all-air system, without reducing the difference of indoor and outdoor pressure and improving the resistance of entrances, only increasing the temperature of supply air is an energy-cost way for **increase** the indoor temperature.

# 35

Recently, hazy weather appears frequently. Many **researches** showed that indoor particulate matter concentrations are highly correlated with outdoor concentration levels and that theexposure tofine particulate matter (PM2.5) will cause many serious illnesses of human **body**. Therefore, it's necessary to control indoor PM2.5 concentration. Uncontrolled air infiltration across a building exterior directly influences indoor PM2.5 concentration and building energy consumption. Whereas, the existing test methods of air infiltrationinvolve complex operations andheavy workload and are lack of universality for different types of buildings. Hence, it's very important to establish a comprehensive and universal method to access the infiltration rate, and also, to figure out the relationship between infiltration rate and indoor PM2.5 concentration.

The following work establishes a new method based on indoor and outdoor PM2.5 mass balance to access the infiltration rate for buildings with different volumes. The method has been applied in an office building and a large shopping center. The results confirm that the method has a viable degree of accuracy. Furthermore, starting from the reasons causing air infiltration in buildings, the feasibility of using mechanical fresh air to restrain air infiltration is figured out. Based on PM2.5 mass balance and the relationship between the fresh air rate and the infiltration rate, strategies to control indoor PM2.5 concentration for differenttypes of buildings are put forward.