



NEW STARLIGHT



APPLICATIONS OF SEISMIC ISOLATION TECHNOLOGY IN POST-EARTHQUAKE RECONSTRUCTION AND REINFORCEMENT

—— SAFETYINSIDE 震安科技 ——

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1

Research on Earthquake Disasters

2

Introduction to Seismic Isolation and
Energy Dissipation Technologies

3

Application of Seismic Isolation
Technology

4

Iconic Projects



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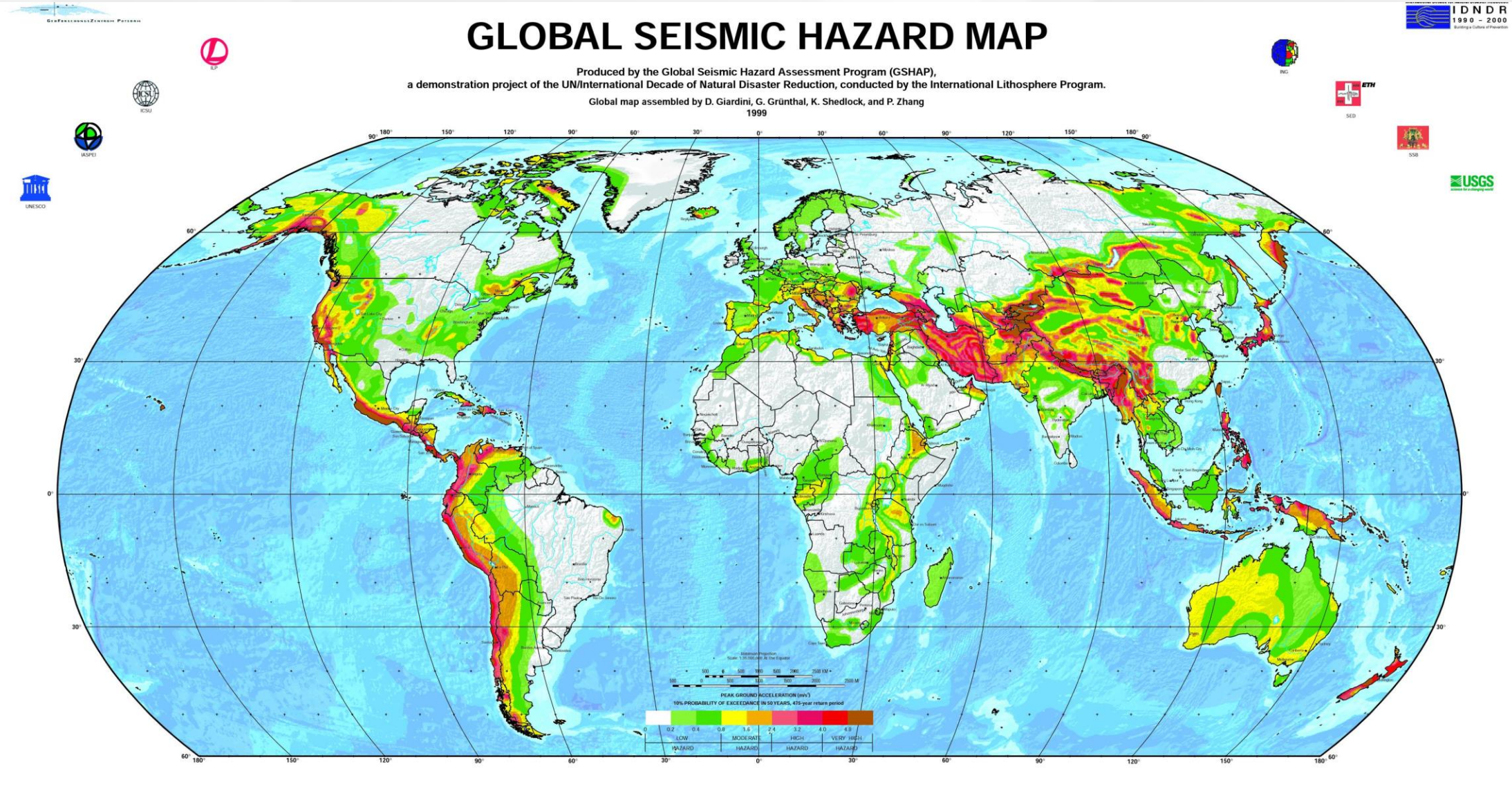


Part 1

Research on Earthquake Disasters



Global Seismic hazard





Global Seismic hazard

The number of deaths from **earthquakes exceeds** the total of all other natural disasters combined!



Tangshan CHN (1976)

Richter magnitude: 7.8

240,000 fatalities



Wenchuan CHN (2008)

Richter magnitude: 8.0

70,000 fatalities



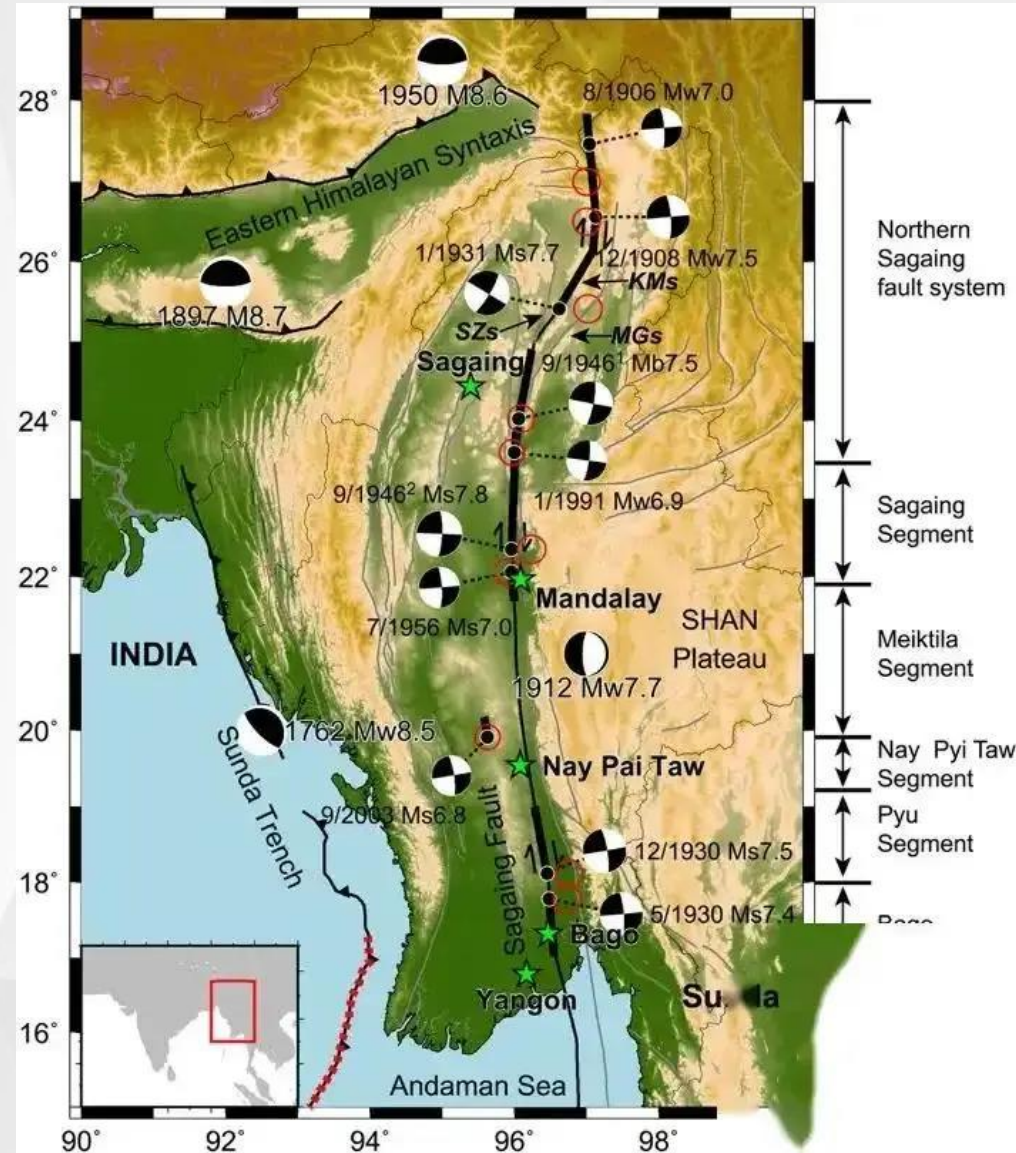
Sagaing MMR (2025)

Richter magnitude: 7.9

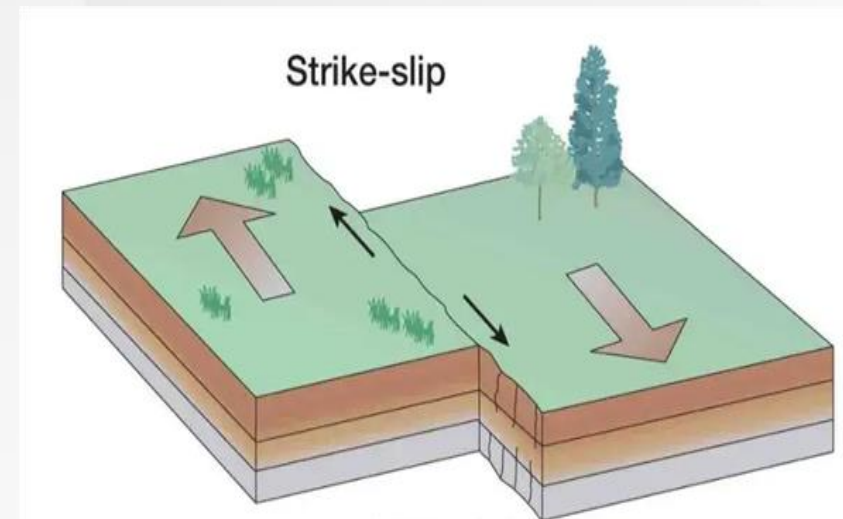
3,839 fatalities



3.28 Myanmar Earthquake

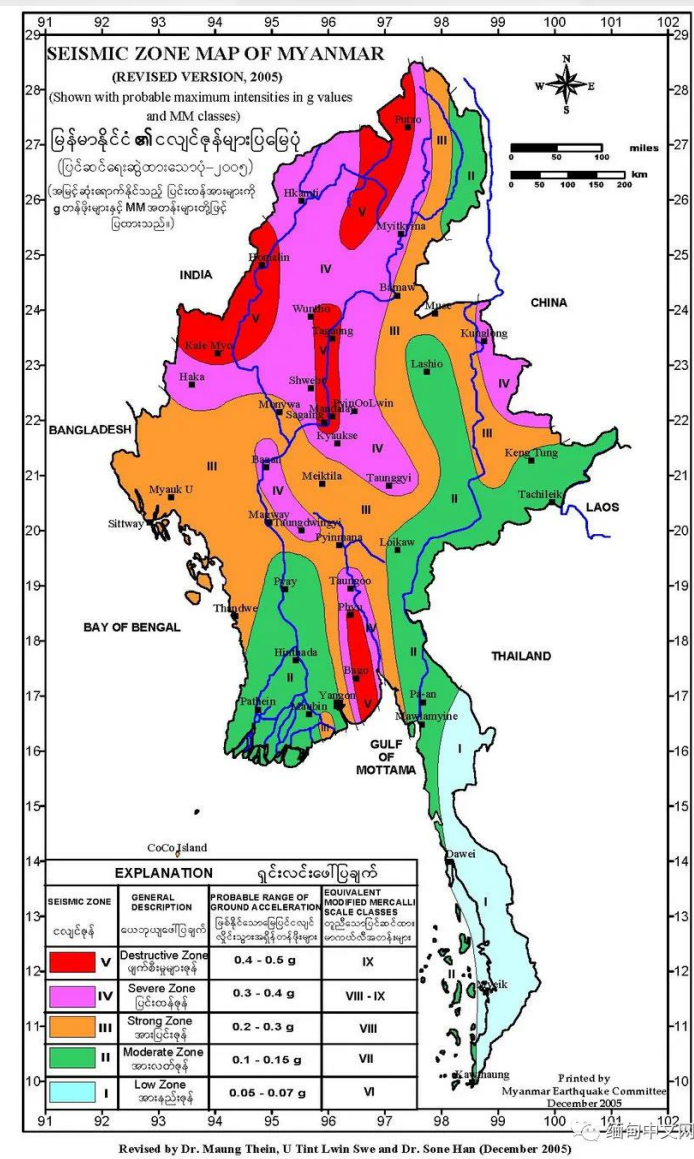


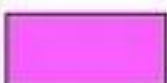
- **Location:** edge of the **collision zone** between the **Indian Plate** and the **Eurasian Plate**.
- **Forme:** **Subduction-shear** composite boundary.
- **Tectonic structure:** **Sagaing Fault Zone**.
- **History:** Since 20th, **nine major** earthquakes over magnitude of 7.
- **Fault Displacement:**
around 3m, tearing
displacement up to 6m.





Seismic Zone of Myanmar



EXPLANATION		ရှင်းလင်းဖော်ပြချက်	
SEISMIC ZONE	GENERAL DESCRIPTION	PROBABLE RANGE OF GROUND ACCELERATION	EQUIVALENT MODIFIED MERCALLI SCALE CLASSES
ငလျင်ဇုန်	ယေဘုယျဖော်ပြချက်	ဖြစ်နိုင်သောမြေပြင်ငလျင် လှိုင်းသွားအရှိန် တန်ဖိုးများ	တူညီသောပြင်ဆင်ထား မာကာယလီအတန်းများ
 V	Destructive Zone ဖျက်စီးမှုများဇုန်	0.4 - 0.5 g	IX
 IV	Severe Zone ပြင်းထန်ဇုန်	0.3 - 0.4 g	VIII - IX
 III	Strong Zone အားပြင်းဇုန်	0.2 - 0.3 g	VIII
 II	Moderate Zone အားလတ်ဇုန်	0.1 - 0.15 g	VII
 I	Low Zone အားနည်းဇုန်	0.05 - 0.07 g	VI

Tectonic Activity characteristic:

High frequency, large magnitude, wide distribution, and severe disasters.



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Part 1 Research on Earthquake Disasters

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Seismic Isolation Principle

SAFETYINSIDE has always been concerned about the post-earthquake recovery and reconstruction in Myanmar.

Following the earthquake, SAFETYINSIDE' s key technical personnel visited the disaster-stricken areas to conduct field investigations and research, and carried out a detailed analysis of the damage to local building structures.





Earthquake Cases

China (The Lushan earthquake, 2013)

The old outpatient building of Lushan County People's Hospital was severely damaged in the earthquake and lost its usability.



Traditional earthquake-resistant
Old Outpatient Building of Lushan County
People's Hospital





Earthquake Cases

New Outpatient Building of Lushan County People's Hospital:

The new outpatient building, which is **only 5m away** from the old outpatient building, with a base-isolated system, was not damaged in the earthquake **and still functioned**.



New Outpatient Building of Lushan County People's Hospital



Earthquake Cases

Japan (The Tōhoku (311) earthquake, 2011)

Many traditional earthquake-resistant buildings, including steel structures, reinforced concrete structures, and brick-concrete structures, were severely damaged.



Traditional designed earthquake-resistant buildings



Earthquake Cases

Ishinomaki Red Cross Hospital:

The hospital's building was designed with a base-isolated system, sustained no loss of functionality; **within an hour** post-quake it treated over 2,750 patients, with equipment **fully operational**.



Ishinomaki Red Cross Hospital





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Part 2

Introduction to Seismic Isolation and Energy Dissipation Technologies



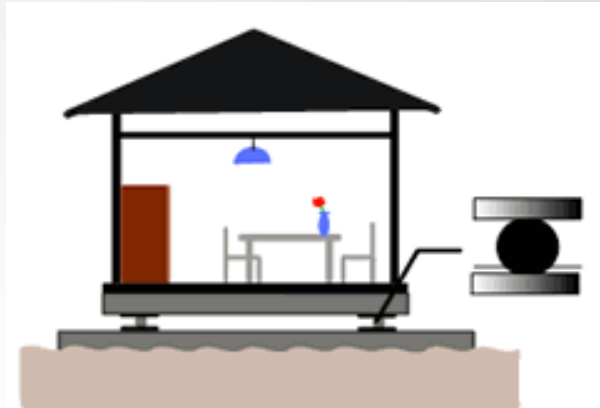
Seismic Isolation Technology

Traditional structure



Resisting seismic energy through the strength of beams and columns

Isolation structure



Isolate 80% of seismic energy

Energy dissipation structure



absorb 20%-30% of seismic energy



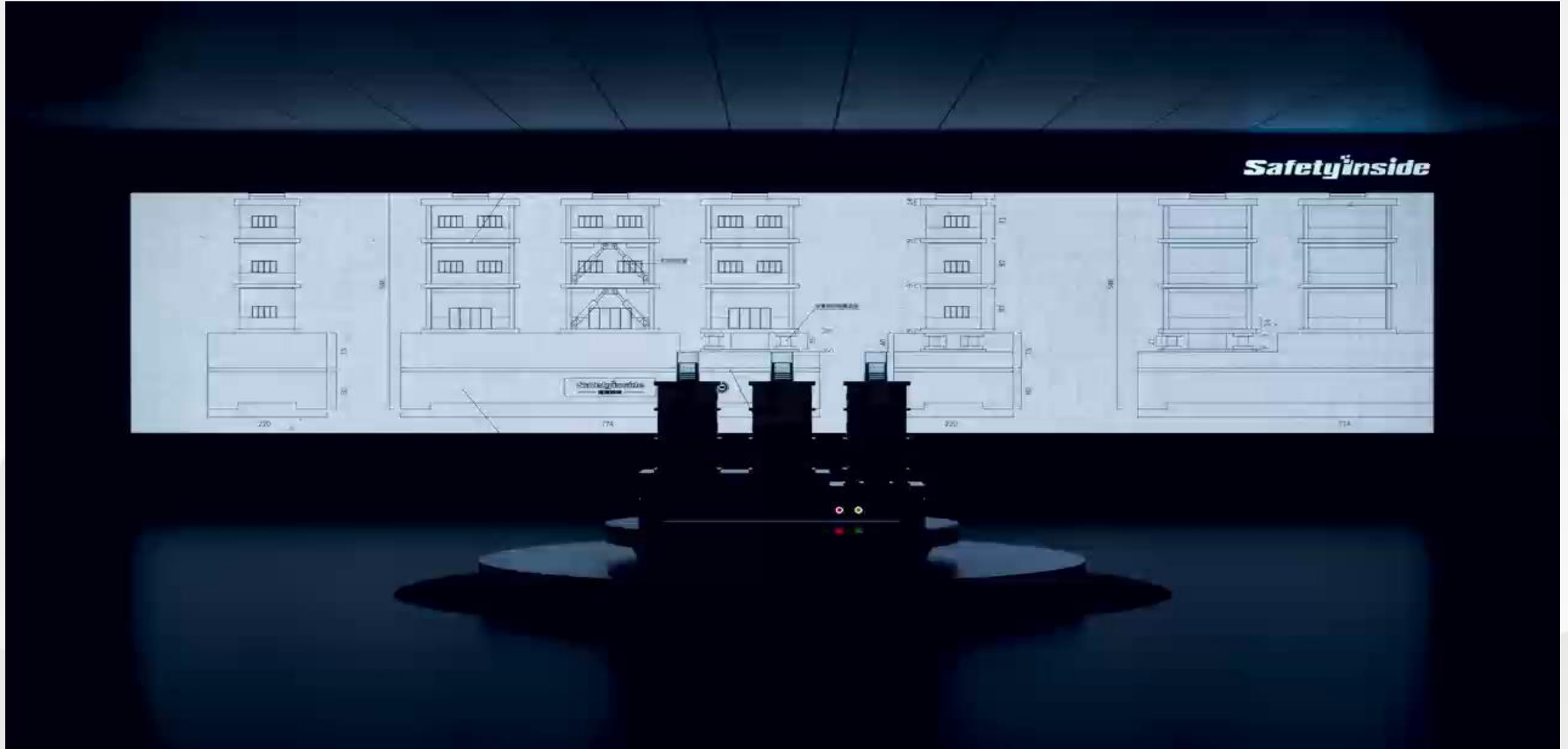
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Seismic Isolation Technology





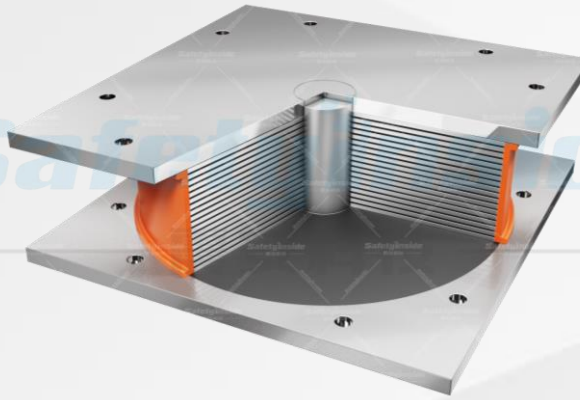
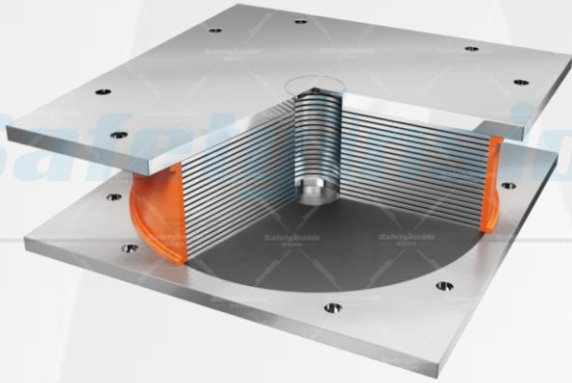
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Seismic isolation devices

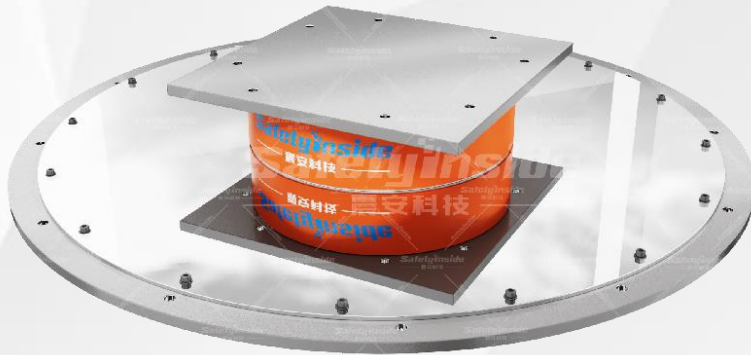


LRB: Lead rubber bearing



FPS: Friction pendulum system

LNR: Nature rubber bearing



ESB: Elastic sliding bearing



FJ (Flexible joints for seismic isolation buildings)



Damping Spring Bearing



Friction Pendulum isolation & Vibration control Bearing



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Energy dissipation devices



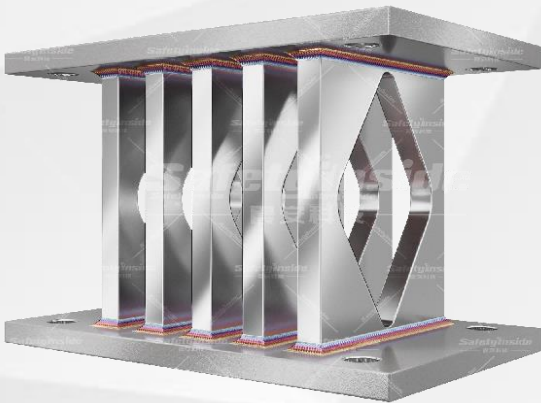
Viscous Fluid Damper
VFD



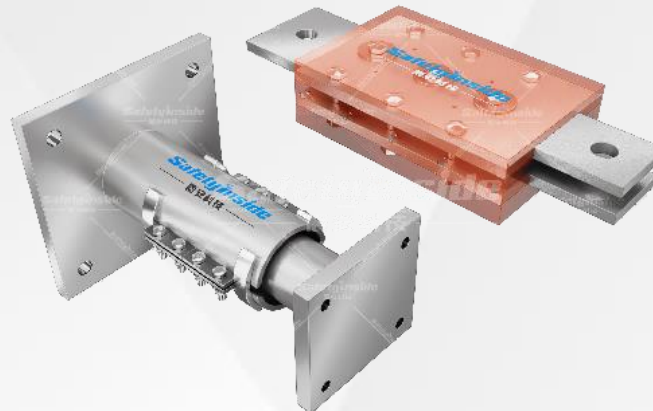
Buckling Restrained Brace
BRB



Viscoelastic Damper
VED



Metallic Yield Damper
MYD



Friction Damper
FD



Eddy Current Damper
ECD



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Introduction to Seismic Isolation and Energy Dissipation Technologies

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Application Areas



School



Hospital



Kindergarten



Broadcasting and television station



Child care



Elderly care building



Emergency operations Center building



Emergency shelter building



Isolation technology in Yunnan

000677

云南省人民政府令

第 202 号

《云南省隔震减震建筑工程促进规定》已经 2016 年 8 月 2 日
云南省人民政府第 92 次常务会议通过，现予公布，自 2016 年
12 月 1 日起施行。

省 长

2016 年 8 月

云南省隔震减震建筑工程促进规定

第一条 为促进隔震减震建筑工程的发展，提高建筑工程的
抗震设防能力，保护人民生命和财产安全，根据《中华人民共和
国建筑法》《中华人民共和国防震减灾法》《云南省建设工程抗震
设防管理条例》等有关法律法规，结合本省实际，制定本规定。

第二条 本省行政区域内建筑工程隔震减震技术的推广应用
及隔震减震建筑工程的监督管理等活动，适用本规定。

第三条 下列新建建筑工程应当采用隔震减震技术：
(一) 抗震设防烈度 7 度以上区域内三层以上、且单体建筑
面积 1000 平方米以上的学校、幼儿园校舍和医院医疗用房建筑
工程；

(二) 前项规定以外，抗震设防烈度 8 度以上区域内单体建
筑面积 1000 平方米以上的重点设防类、特殊设防类建筑工程；

(三) 地震灾区恢复重建三层以上、且单体建筑面积 1000 平
方米以上的公共建筑工程。

鼓励前款规定范围以外的其他建筑工程采用隔震减震技术。

第四条 县级以上人民政府应当加强对隔震减震建筑工程促
进工作的领导，宣传普及和推广应用隔震减震技术，并提供必要
的经费保障。

— 1 —

2016

The **Government of Yunnan Province** issued the "Yunnan
Province Regulations on Promoting Seismic Isolation and
Energy Dissipation in Construction Projects."

Requirements:

- (1) School buildings, kindergarten facilities, and hospital
medical buildings with **three or more stories** and a single-
building floor area exceeding 1,000 square meters ;
- (2) Key fortification and special fortification buildings with a
single-building floor area exceeding 1,000 square meters;
- (3) Public buildings with three or more stories and a single-
building floor area **exceeding 1,000 square meters**
constructed during **post-earthquake recovery and**
reconstruction.



Isolation technology in China



建设工程抗震管理条例

中国法制出版社

2021

The State Council of the People's Republic of China

Promulgated the "**Regulations** on Seismic Fortification of Construction Projects".

Article 16:

For new construction of the above facilities in

- **High-intensity zones**
- **Key seismic monitoring regions**

Seismic isolation/damping technologies shall be applied.

Facilities: Schools, Kindergartens, Hospitals, Elderly care facilities, Child welfare institutions, Emergency command centers, Emergency shelters, Broadcasting/television facilities.

China seismic isolation building: 30,000.



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Part 3

Application of Seismic Isolation Technology



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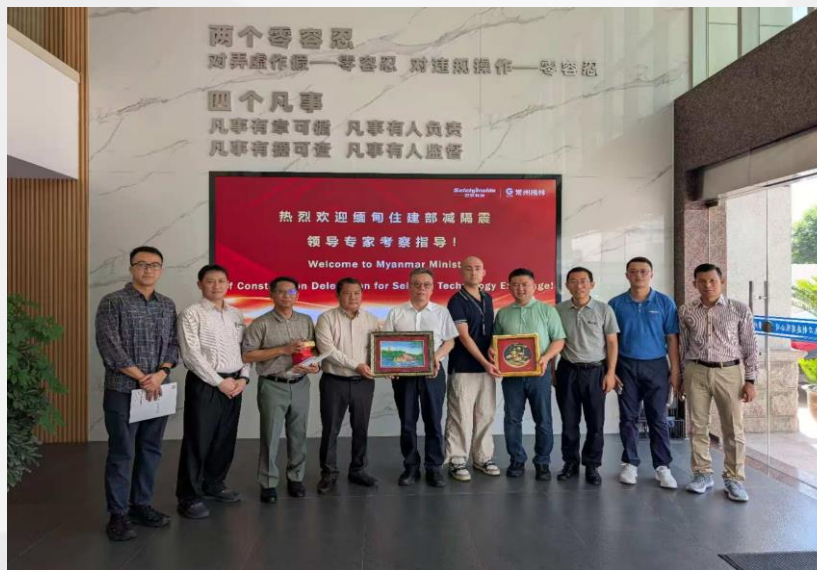
Part 3

Application of Seismic Isolation Technology

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Seismic Isolation Principle

In the first half of this year, multiple batches of Myanmar post-disaster reconstruction delegations successively visited SAFETYINSIDE to conduct inspections and exchanges on the application of building seismic isolation technology in Myanmar's post-disaster reconstruction.





Introduction

By integrating isolation in rebuilding—especially for hospitals and schools—future quakes could cause significantly less disruption, injury, and economic loss.

1. Protecting Critical Facilities

Hospitals, schools, bridges, water treatment plants—currently vulnerable to total loss—could stay operational during shakes if built or upgraded with isolation systems (e.g., lead-rubber bearings, friction pendulum devices).

2. Mitigating Regional Impact

Adopting could reduce the amplification effect in distant urban areas, reducing unintended cross-border damage.

3. Guiding Policy & Code Enhancement

isolation systems are a proven retrofit solution that the government and aid agencies could prioritize.



Design Process Overview

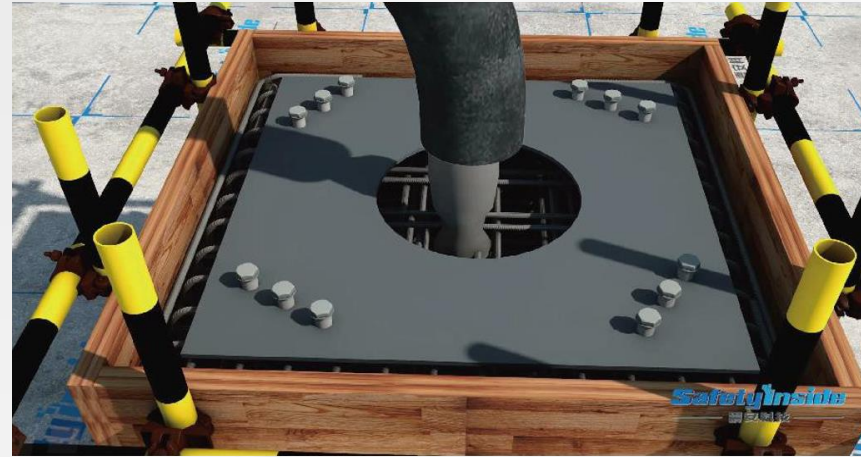
How to design a seismic-isolated /or damping-enhanced building:

- Selection of seismic isolation design structural code and Initial Structural Design
- Choose Seismic Strategy
- Design Base Isolation /or Design Dampers
- Whole-System Analysis
- Modify & Optimize
- Implementation & Maintenance

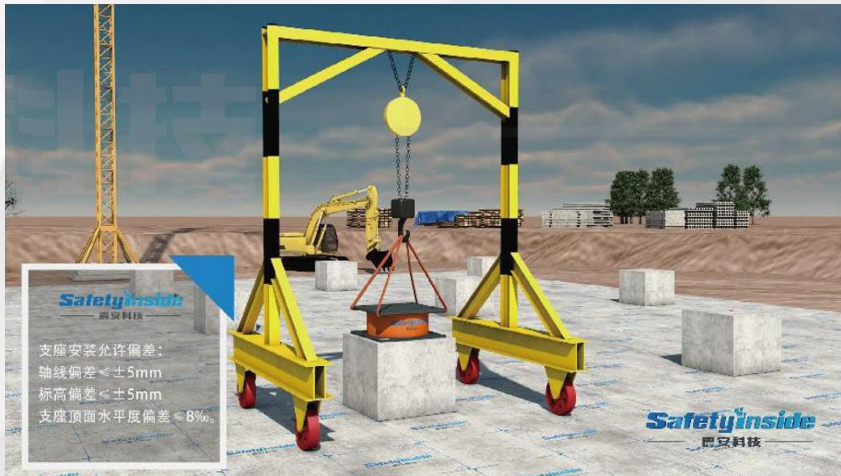




Isolation Installation



- Lower connection components installation
- Bottom buttress framework concrete pouring
- Pre-embedded plate removal top surface leveling



- Installation of rubber bearing and upper pre-embedded components
- Construction of upper buttress, beam and slab of isolation layer of isolation layer



Design Process Overview

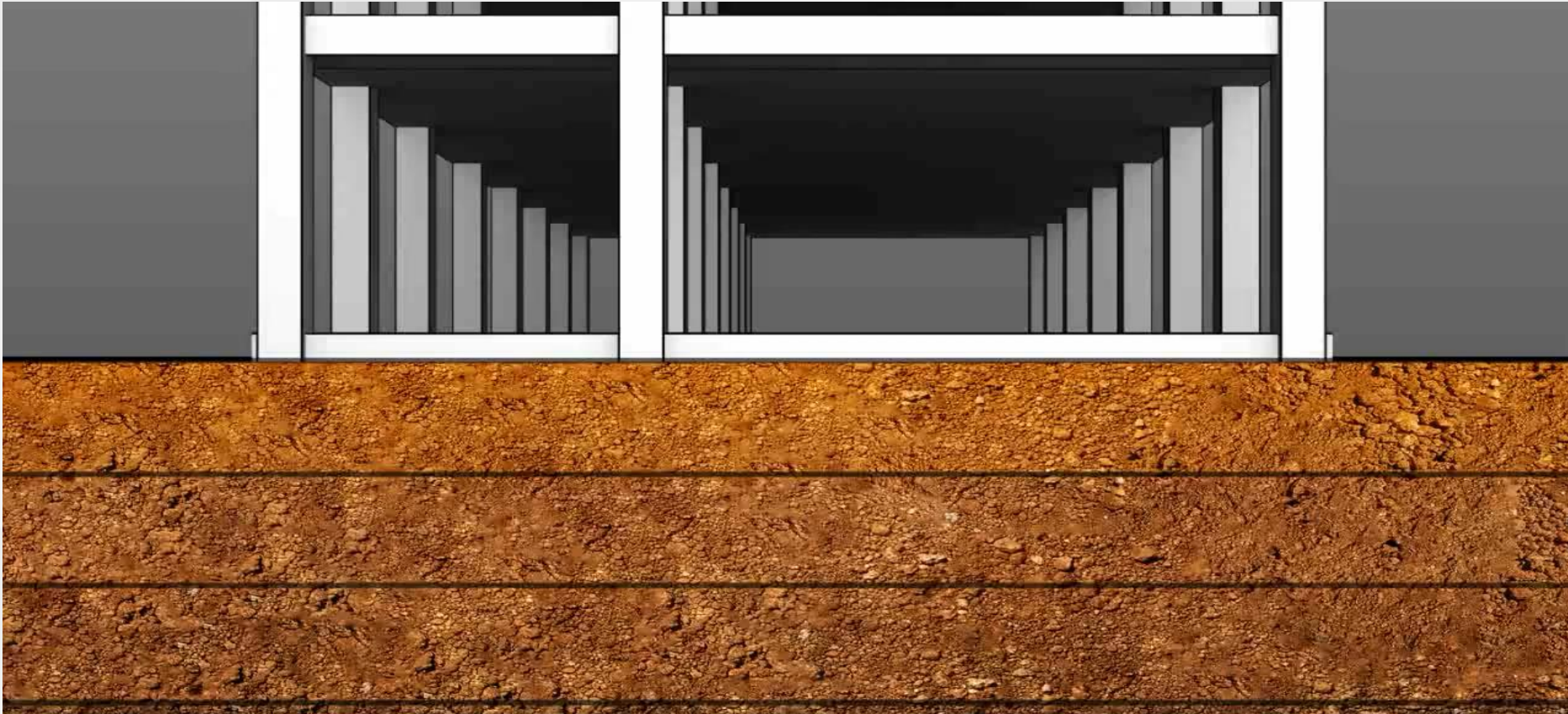
How to design a seismic reinforcement with base isolation and/or damping involves several integrated steps:

- Preliminary Assessment & Strategy
- Base Isolation Design
- Damping System Integration
- Analysis & Optimization
- Construction & Detailing
- Quality Control & Maintenance





Reinforcement



1. Soil excavation
2. Set up the concrete pad
3. Base of Columns reinforced
4. Set up Oil jack
5. Cut the columns
6. Install rubber bearings
7. Pouring high strength grout
8. Demolish oil jack
9. Reinforce first floor
10. Finished



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Part 4

Iconic Projects



Information about SafetyInside - Flagship Projects

Project name: Beijing Daxing International Airport

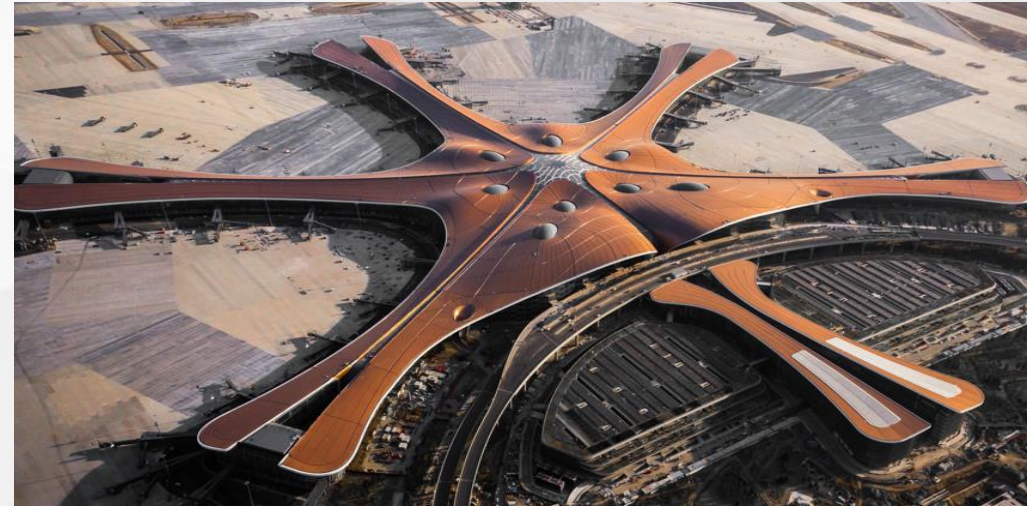
Project location: Daxing District, Beijing

Seismic fortification criterion: 8 (0.20g)

Using products: Rubber bearing, Elastic sliding bearing, Fluid viscous damper

Products characteristics:

1. One of the largest individual isolation projects in the world, building area of 750000 m².
2. The core area is only supported by 6 special-shaped steel structural columns, with high seismic requirements.
3. Featuring a highly complex integrated transportation system with a vertical length of 16 meters, high-speed trains can pass directly below the terminal building at a speed of 350 kilometers per hour.
4. Works of Zaha Hadid, Selected by The Guardian as the top seven wonders of the new world.





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Part 4 Iconic Projects

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Information about SafetyInside - Flagship Projects

Project name: Yunnan Lijiang Sanyi International Airport

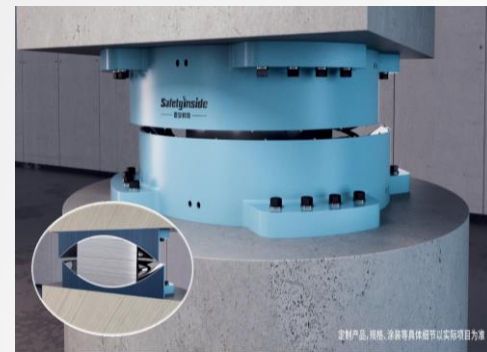
Project location: Lijiang City, Yunnan Province

Seismic fortification criterion: 8 (0.30g)

Using products: Friction pendulum system

Project characteristics:

After the expansion of the airport, it will be able to meet the annual passenger throughput of 11 million people and the annual demand for 84478 flight departures and landings at Lijiang Airport.





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Part 4 Iconic Projects

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Information about SafetyInside - Flagship Projects

Project name: Caofeidian LNG Project

Project location: Tangshan City, Hebei Province (Caofeidian Industrial Zone)

Seismic fortification criterion: 8 (0.20g)

Using products: Rubber bearing

Project characteristics:

After adopting isolation technology, in addition to maximizing the seismic safety of LNG, it can also carry tanks with a capacity four times larger than traditional seismic design, reflecting unparalleled economic advantages.





Information about SafetyInside - Flagship Projects

Project name: Construction Project of Xi'an Public Health Center (New Site of Xi'an Center for Disease Control and Prevention)

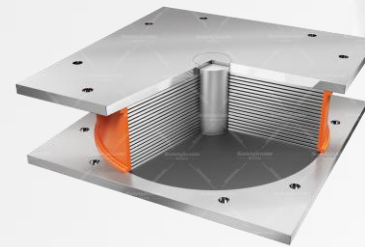
Project location: Xi'an City, China

Seismic fortification criterion: 8 (0.20g)

Using products: Rubber bearing, Fluid viscous damper

Project characteristics:

The Xi'an Public Health Center project is in line with the "4A" standard. All wards are designed as negative pressure wards according to special ward standards, using high-quality seismic isolation bearings and dampers from SafetyInside.





Information about SafetyInside - Flagship Projects

Project name: Beijing Haidian District Subway Line 16
Bei'anhe Rolling Stock Depot Comprehensive Utilization

Project location: Haidian District, Beijing

Seismic fortification criterion: 8 (0.20g)

Using products: Friction pendulum three-dimensional bearing

Project characteristics:

The "**seismic isolation & vibration control**" technology of **SafetyInside** utilizes seismic vibration dual control bearings containing vertical and horizontal isolation modules to achieve dual control of structural vertical vibration and horizontal vibration caused by earthquakes, making homes both safe and comfortable.





Information about SafetyInside - Flagship Projects

Project name: Renovation project of historical protected buildings at 106 Huangpu Road, Shanghai

Project location: Hongkou District, Shanghai

Seismic fortification criterion: 7 (0.10g)

Using products: Rubber bearing, Fluid viscous damper

Project characteristics:

This project will use seismic isolation technology to reinforce historical buildings after they are lifted, which can significantly increase the seismic performance of the building while maintaining its original appearance.





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Part 4 Iconic Projects

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Information about SafetyInside - Flagship Projects

Project name: China International Silk Road Center Building

Project location: Xi'an, China

Seismic fortification criterion: 8(0.2g)

Using products: Fluid Viscous Damper

Project characteristics:

The China International Silk Road Center Building project is invested by Greenland Group, designed by SOM in the United States, The total construction area is 383200 square meters, with a building height of 498 meters and a total of 100 floors above ground. It is the tallest building in the northwest and a new landmark on the city cover level of Xi'an.





Part 4 Iconic Projects

Information about SafetyInside - Flagship Projects

Project name: Global Headquarters Building of China Merchants Bank

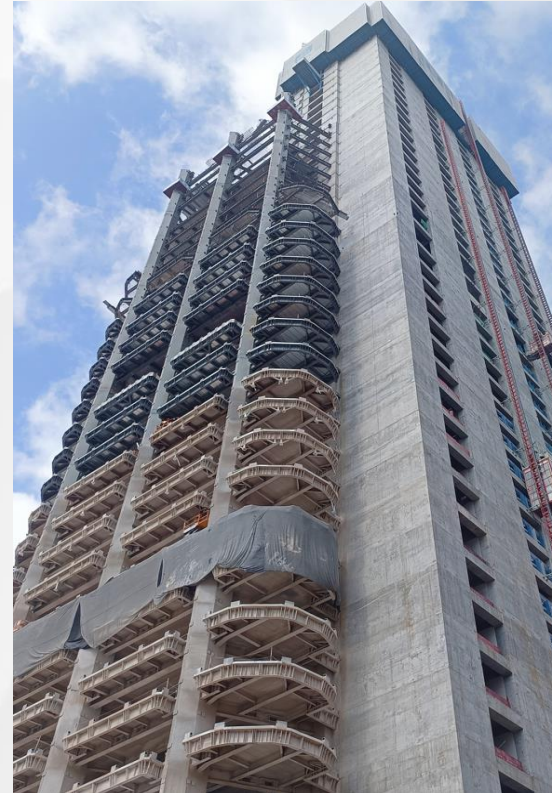
Project location: Shenzhen, Guangdong Province

Seismic fortification criterion: 7 (0.10g)

Using products: Buckling-restrained brace (BRB), Tuned mass damper

Project characteristics:

The headquarters of China Merchants Bank in Shenzhen is located in Shenzhen Bay, with a total area of 35500 square meters and a total construction area of approximately 480000 square meters. As a part of the overall plan, the 388-meter-high main tower will bring a brand new look to the city.





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Part 4 Iconic Projects

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Company Overview

QuakeSafe Technologies Co., Ltd., known globally as the brand **SafetyInside**, holds an unparalleled leading position in the global building seismic isolation and energy dissipation fields. As the number one provider of **seismic isolation systems** (seismic isolators) and **energy dissipation** (dampers) products in China, SafetyInside offers the most reliable structural safety protection solutions to customers worldwide with its remarkable innovation capabilities, extensive project experience, and top - notch production capacity.

China's No.1
Seismic isolation company

+150000 (sets)
Annual production capacity

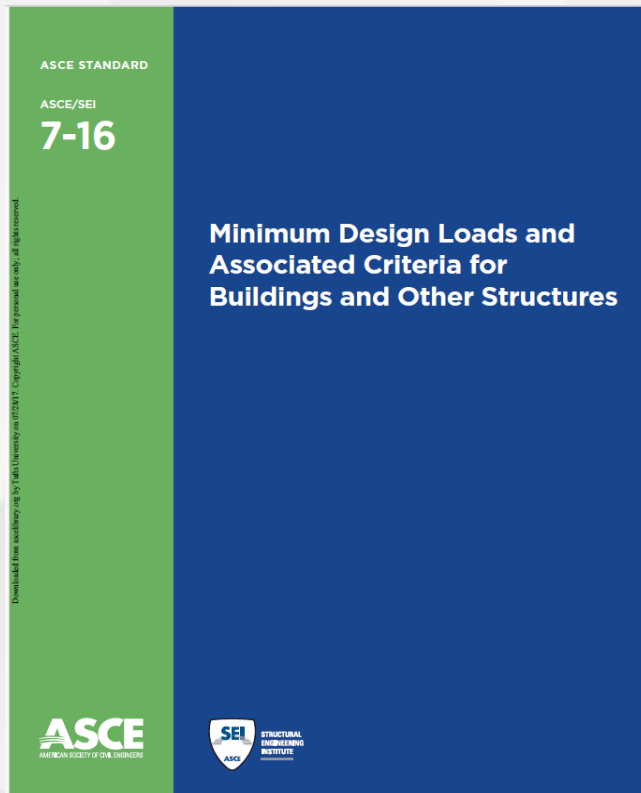
+23000 (Buildings)
Experience in participating in projects

+70
Domestic participation standards



Information about SafetyInside - Product Manufacture

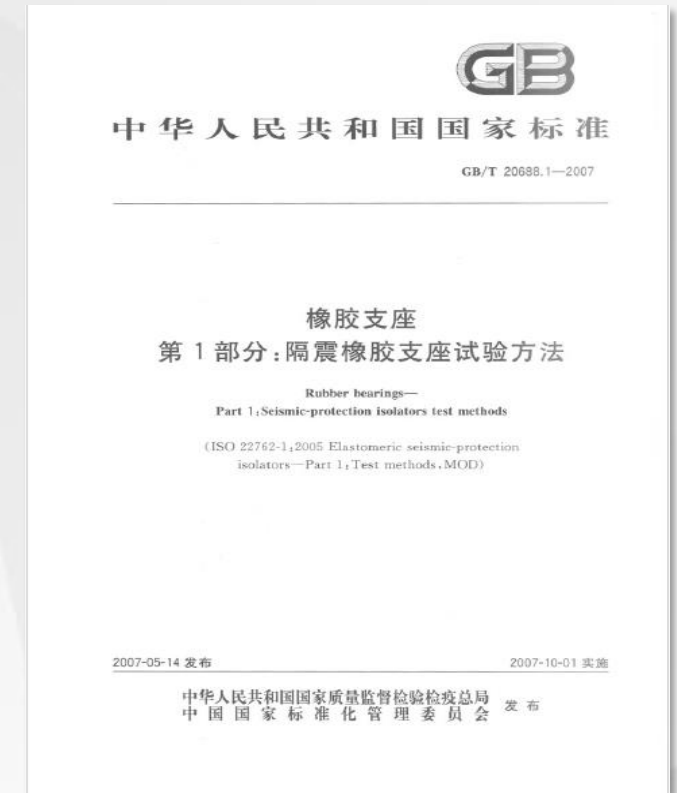
Product design Criteria: International, national, industrial, local.



USA



EN



CHN



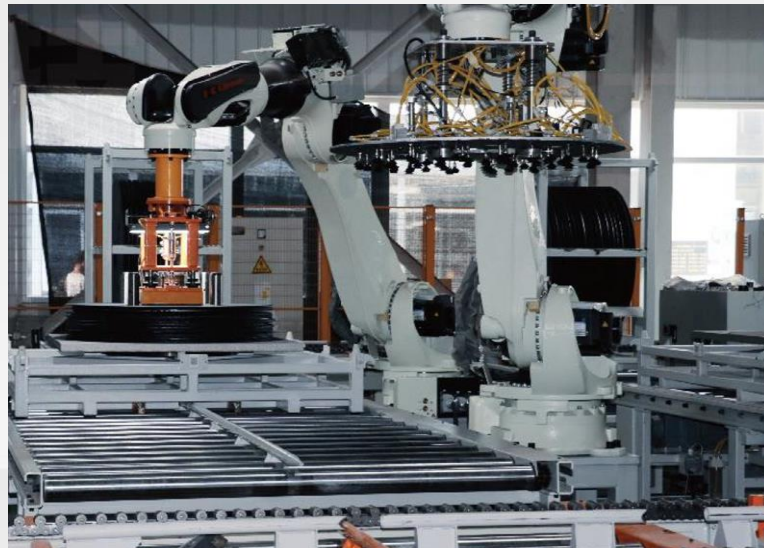
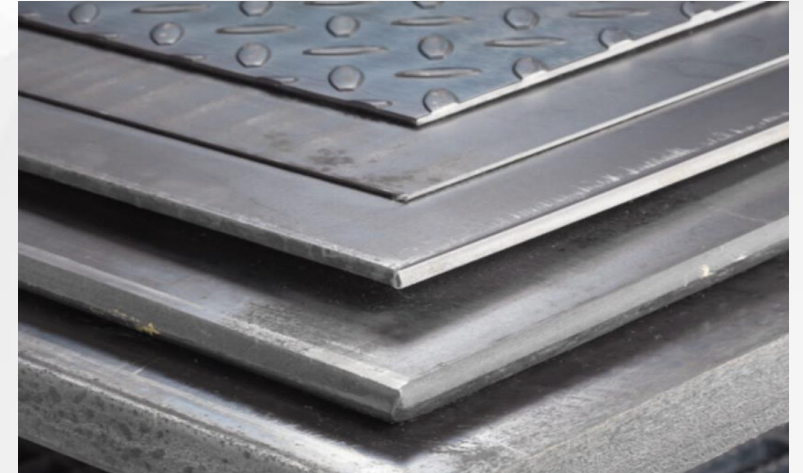
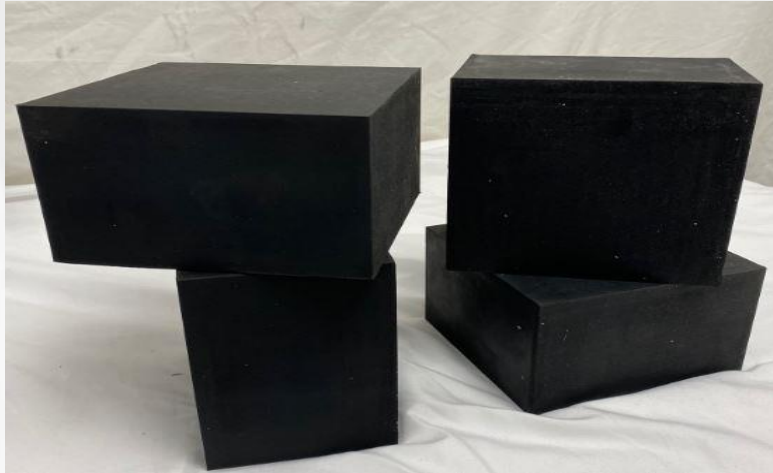
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Information about SafetyInside - Product Manufacture

Raw material&Production: Ensure the quality





Information about SafetyInside - Product Manufacture

Quality control: Material quality control & Product quality control & procedure.



Visual inspection



Compression performance



Shear performance



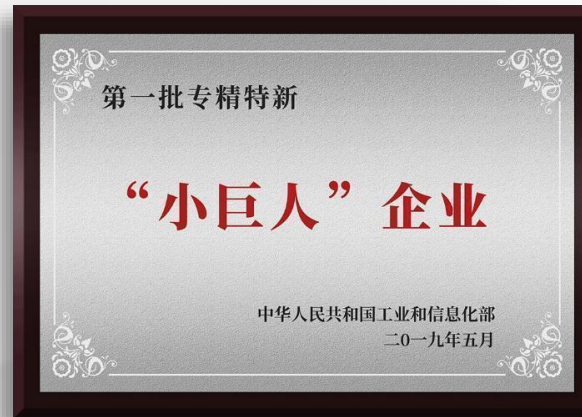
*Limite performance



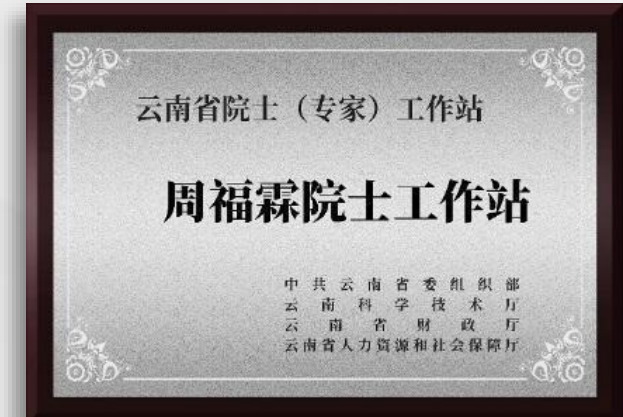
Information about SafetyInside - Product Manufacture



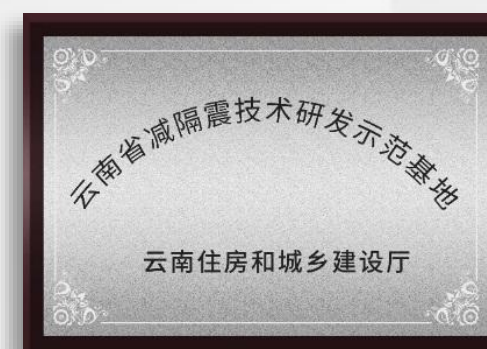
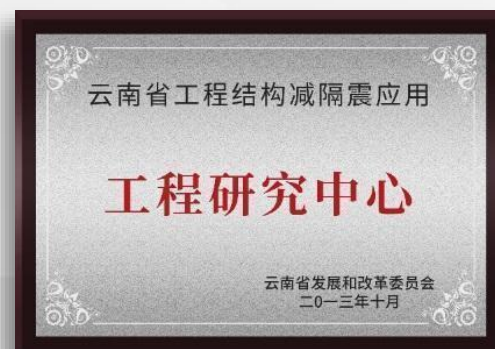
China National Manufacturing individual **Champion**



The 1st batch Special and New the **Little Giant** enterprise



Fulin Zhou **Academician** workstation





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Life matters !

Make the world safer!



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