

Earthquake Resistant Structures

抗震建築物

Understanding the problem

According to earthquake monitoring data, Taiwan encounters an average of approximately 2,200 earthquakes each year, with around 214 of them being noticeable. The primary objective of earthquake-resistant structures is to reduce harm and casualties during seismic events. These structures are meticulously designed to withstand the most likely maximum earthquake that could occur in their specific areas, with the aim of minimizing damage and guaranteeing safety.

Gathering facts

The students, working as earthquake engineers, were assigned the responsibility of designing and constructing a building that could withstand the heightened risk of powerful earthquakes in their nation. Their objective was to employ the engineering design process in order to devise solutions that would ensure the safe evacuation of individuals from the building. Extensive research was conducted on the causes and consequences of earthquakes, with a particular focus on studying various techniques such as base isolation and tuned mass dampers. These methods were explored as means to counteract the formidable forces generated by earthquakes.

Finding solutions

Testing was one of the most important components of the process for this project and students had opportunities throughout the planning and create stage to use the shake table and see what improvements their buildings needed prior to a final test towards the end of the project. Testing was done on the shake table for both fast and slow waves at magnitude 4 and 7 earthquakes.

理解問題

根據地震監測資料，台灣平均每年發生地震約 2,200 次，其中有感地震約 214 次。抗震結構旨在減少地震期間的損壞和傷害。這些建築結構設計都是根據其位置可能發生的最大地震機率建造，以將傷害降到最低並確保安全。

蒐集實例

作為地震工程師，學生的任務是設計和建造一座可以承受高強度地震的抗震建築。他們的目標是使用工程學設計過程提出解決方案，讓人們安全地撤離大樓。學生對地震的原因和影響進行了不同的研究，例如基礎隔離和調整質量阻尼器，以對抗地震產生的強大力量。

尋找解決方案

測試是此次專題過程中最重要的部分之一，學生在整個規劃和創造階段皆有機會使用振動台做測試，並在專題結束前確認建築物還需要進行哪些改善。他們在振動台上進行從 4 級及 7 級地震的快波和慢波的測試。

1

ASK + IMAGINE
提問 + 創思

2

Learning about how buildings are affected by earthquakes.

了解建築物如何被地震影響。



4

CREATE
創造

5

Constructing an earthquake resistant building.

建造耐震建築。



6

PRESENT
展現

7

Sharing the findings with the class.
與班上同學分享他們的研究結果。



3

PLAN
計畫

4

Studying the material and collaborating on a plan.

研究材料並合作制定計畫。



5

IMPROVE
改進

6

Testing and making adjustments to their structures.

測試和調整建築結構。

