

Earthquake Resistant Structures

抗震建築物

Understanding the problem

According to earthquake monitoring information, the average number of earthquakes in Taiwan is approximately 2,200 per year, of which, approximately 214 can be felt. Earthquake-resistant structures are designed to minimize damage and injury during earthquakes. These structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location.

Gathering facts

As earthquake engineers, the students were tasked to design and build an earthquake resistant building due to the increased threat of stronger earthquakes in their country. They had to use the engineering design process to come up with solutions that will get people out of the building safely. Research was done on the cause and effect of earthquakes but primarily they studied different methods for example base isolation and tuned mass dampers to combat the strong forces produced 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。

蒐集實例

作為地震工程師，學生的任務是設計和建造一座抗震建築，因為我們所在國家的強震威脅越來越大。我們必須使用工程學設計過程提出解決方案，讓人們安全地離開大樓。學生對地震的原因和影響進行了不同方法的研究，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 級至 7 級地震的快波和慢波的測試。

1 ASK + IMAGINE 提問 + 創思

Learning about earthquakes and how they are formed.

瞭解地震以及它的形成方式。



4 CREATE 創造

Constructing and testing the building several times to compare and make changes.

多次建造和測試建築物以進行比較和修改。



6 PRESENT 展現

Sharing the findings with the class.

與班上同學分享他們的發現。

3 PLAN 計畫

Studying the material and collaborating on a plan.

研究材料並合作制定計劃。

5 IMPROVE 改進

Making adjustments to their team buildings after testing.

測試後調整小組的建築物。

