World's Tallest Buildings with Dampers

As tall buildings continue to be built in seismically-active and cyclone-prone areas, the need to augment the structures of these buildings with dynamic modification devices (in this case, dampers) to counteract these forces is growing. This data report graphically summarizes the findings of the CTBUH Research project ***Study on Tall Building Damping Technologies,*** sponsored by Bouygues Construction (see also Damping Technologies for Tall Buildings, page 42).

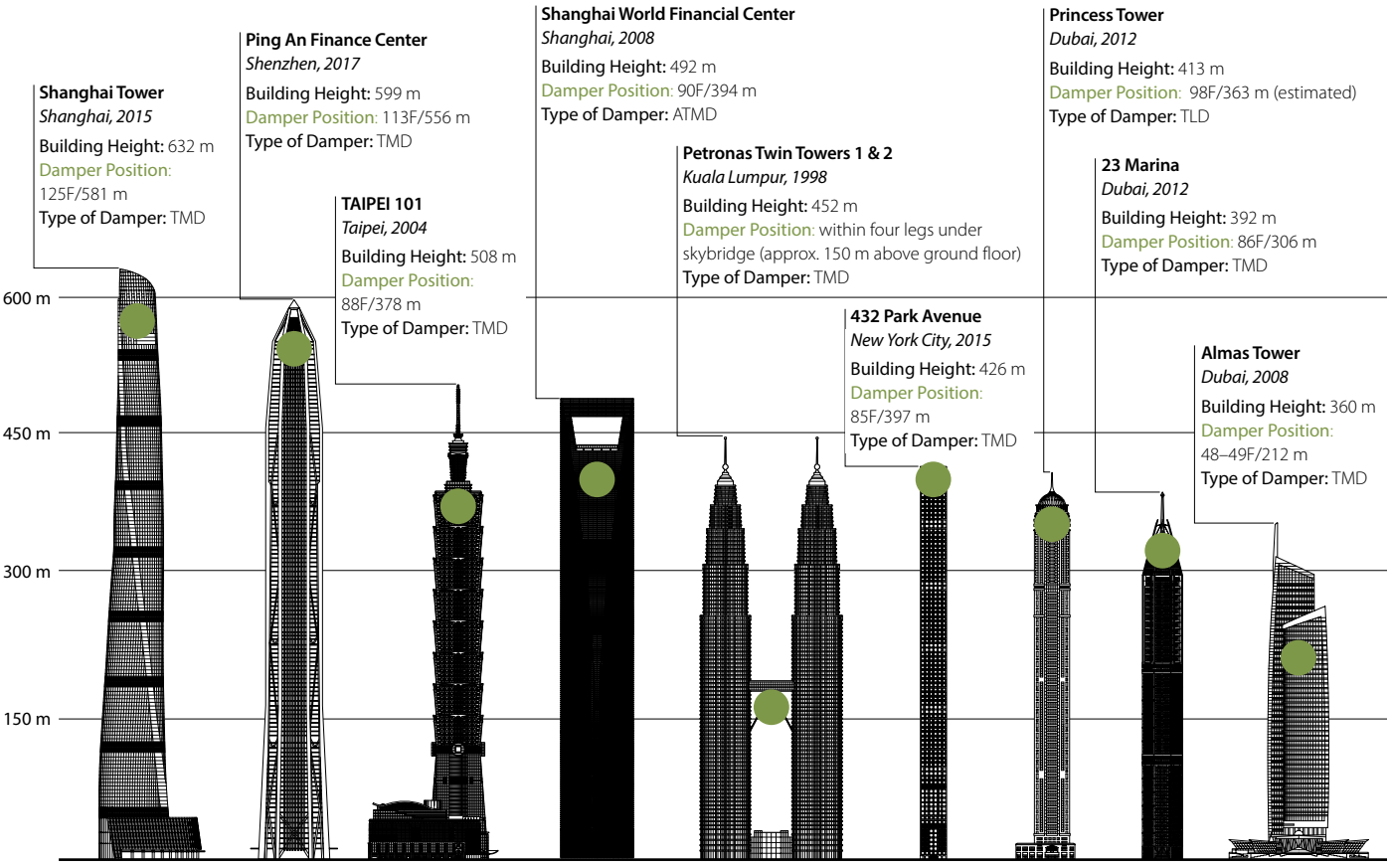
›› *See the full list of buildings with dampers at* **ctbuh.org/damping**

Types of Dampers

AMD = Active Mass Damper
ATMD = Active Tuned Mass Damper
BRB = Buckling Restrained Brace
HMD = Hybrid Mass Damper
TLCD = Tuned Liquid Column Damper
TLD = Tuned Liquid Damper
TMD = Tuned Mass Damper
VD = Viscous Damper
VED = Viscoelastic Damper

See the research paper on page 42 for more details about each damper type.

Tallest 10 Completed Buildings with Dampers



Shanghai Tower
Shanghai, 2015
Building Height: 632 m
Damper Position: 125F/581 m
Type of Damper: TMD

Ping An Finance Center
Shenzhen, 2017
Building Height: 599 m
Damper Position: 113F/556 m
Type of Damper: TMD

TAIPEI 101
Taipei, 2004
Building Height: 508 m
Damper Position: 88F/378 m
Type of Damper: TMD

Shanghai World Financial Center
Shanghai, 2008
Building Height: 492 m
Damper Position: 90F/394 m
Type of Damper: ATMD

Petronas Twin Towers 1 & 2
Kuala Lumpur, 1998
Building Height: 452 m
Damper Position: within four legs under skybridge (approx. 150 m above ground floor)
Type of Damper: TMD

432 Park Avenue
New York City, 2015
Building Height: 426 m
Damper Position: 85F/397 m
Type of Damper: TMD

Princess Tower
Dubai, 2012
Building Height: 413 m
Damper Position: 98F/363 m (estimated)
Type of Damper: TLD

23 Marina
Dubai, 2012
Building Height: 392 m
Damper Position: 86F/306 m
Type of Damper: TMD

Almas Tower
Dubai, 2008
Building Height: 360 m
Damper Position: 48–49F/212 m
Type of Damper: TMD

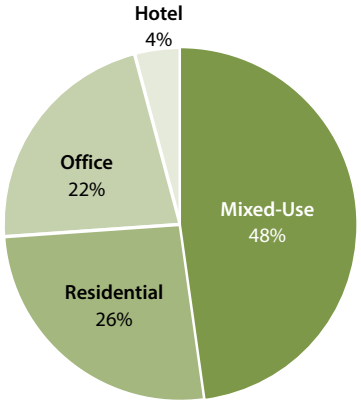
Shanghai Tower's damper is celebrated by a special public "skyspace" with an abstract scultpure atop the damper enclosure.

30% Only 30% of the World's 20 Tallest Buildings are equipped with dampers.

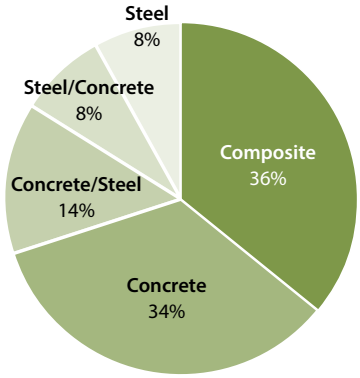
The ball-shaped pendulum damper at **TAIPEI 101** is on public view, and is commemorated with a mascot called "Damper Baby."

Tallest 50 Buildings with Dampers

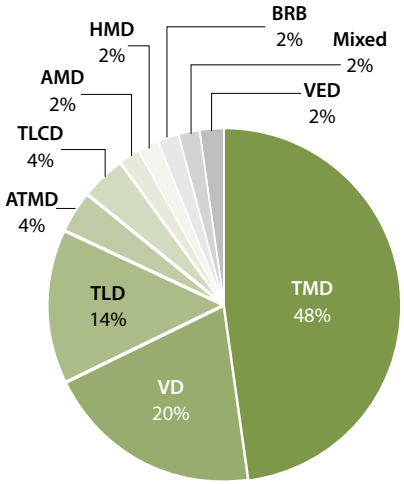
Includes buildings under construction



By Function

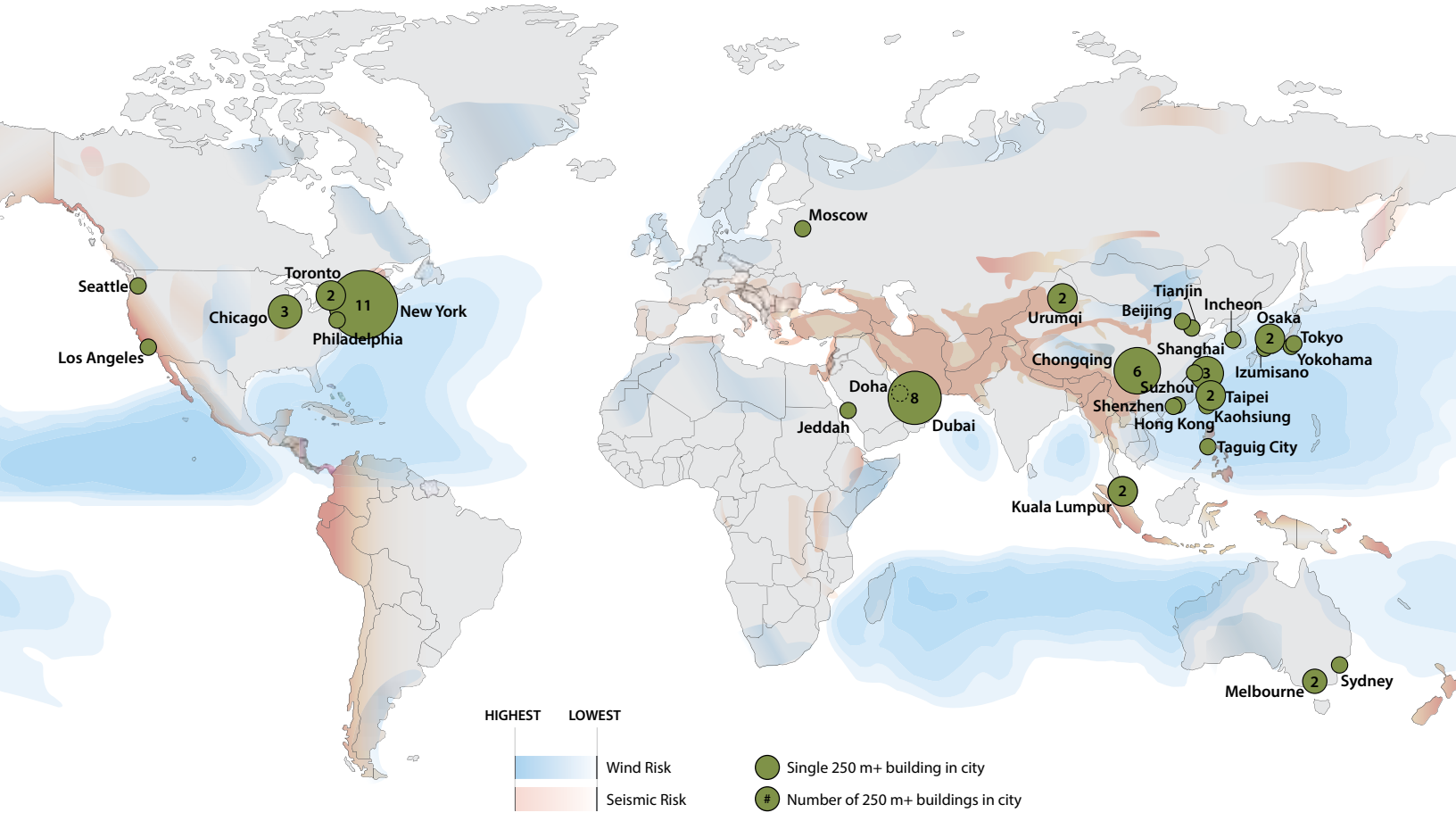


By Primary Structural Material



By Damper Type

All 250 m+ Buildings with Dampers, by Location



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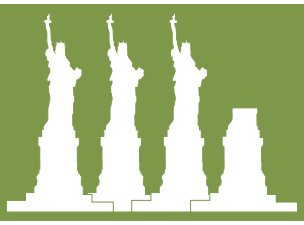
The **Shinjuku Center Tower,** Tokyo (1979) was retrofitted with 288 distributed oil dampers in 2009, which reduced movement by 20% during the 2011 Tohuku earthquake.



The damper at **111 West 57th Street**, New York City, will weigh 726 metric tons – more than 3.5 Statues of Liberty.