# World's tallest structures

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Ostankino Tower in Moscow has been the tallest free-standing structure in Eurasia since 1967.

Until the mid 20th century the record for the **world's** tallest structure was relatively clearly defined (see <u>table below</u>.) Since that time however, more debate and confusion has been present over the criteria and definitions involved. In terms of absolute height, most of the tallest structures are the dozens of radio and television broadcasting towers that are around 600 meters (2000 feet) tall.

Tall-structure enthusiasts debate:

- whether <u>guy-wire</u>-supported structures should be eligible to be counted
- whether only habitable height counts and if so;
- whether observation galleries on communication towers make them into habitable buildings
- whether roof-top <u>antennas</u> can be counted towards height of buildings (the debate over this has especially focused on the fact that things that look like <u>spires</u> can be either classified as an antenna or an "architectural detail")
- whether structures currently under construction can be included in the list
- whether structures rising out of water should have their below-water height included.

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### **Tallest structures**

#### **Tallest Structure by Category**

Skytower - Auckland New Zealand - Free standing tower 328m

Category	Structure	Country/Region	City	Height to relevant point
Supported structure	<u>Mars Tension-leg</u> <u>Platform</u> ***	Gulf of Mexico		990.6 <u>m</u> (3,250 <u>ft</u> )
Building - under construction	<u>Burj Dubai</u>	UAE	Dubai	800 m (est.) (2,624 ft)
Supported structure on land ever built	<u>Warsaw Radio</u> <u>Mast</u>	Poland	Gabin	646.38 m (2,120 ft) (collapsed in 1991)
Supported structure on land	KVLY-TV mast	USA	Blanchard, North Dakota	629 m (2,063 ft)
Freestanding structure	Petronius Platform	Gulf of Mexico		610 m (2,001 ft)

Freestanding structure on land	<u>CN Tower</u>	Canada	Toronto	553 m (1,815 ft)
Building - to highest point	Sears Tower	USA	Chicago	529 m (1,736 ft)
Building - to top of antenna	Sears Tower	USA	Chicago	529 m (1,736 ft)
Building - to architectural top	<u>Taipei 101</u>	Taiwan	Taipei	508 m (1,667 ft)
Building - to top of the roof	<u>Taipei 101</u>	Taiwan	Taipei	448 m (1,470 ft)
Building - to highest occupied floor - under construction	International Commerce Centre	Hong Kong	Hong Kong Island	490 m (1,608 ft)
Building - to highest occupied floor	<u>Taipei 101</u>	Taiwan	Taipei	438 m (1,437 ft)
Twin Towers	<u>Petronas Twin</u> <u>Towers</u>	Malaysia	Kuala Lumpur	452 m (1,482 ft)
Freestanding structure with largest functional structure	<u>Borj-e Milad</u>	Iran	Tehran	435m (1,427 ft)
Chimney	GRES-2 Power Station	Kazakhstan	Ekibastusz	419.7 m (1,375 ft)

Lattice tower	Kiev TV Tower	Ukraine	Kiev	385 m (1,263 ft)
Chimney - freestanding	Inco Superstack	Canada	Sudbury	381m (1,257 ft)
Partially guyed tower	Gerbrandy Tower	Netherlands	Lopik	375 m (1,230 ft)
Bridge pillar	Millau Viaduct	France	Millau	341 m (1,119 ft)
Incomplete building	Ryugyong Hotel	North Korea	Pyongyang	330 m (1,083 ft)
Residential building	<u>Q1</u>	Australia	Gold Coast	323 m (1,059 ft)
Electricity pylon	Pylons of Pearl River Crossing	China	Pearl River	253 m (830 ft)
Minaret	Hassan II Mosque	Morocco	Casablanca	210 m (689 ft)
Tallest wooden tower ever built	Radio Tower Muehlacker	Germany	Mühlacker	190 m (689 ft) (demolished in 1945)
Masonry building	<u>Philadelphia City</u> <u>Hall</u>	USA	Philadelphia	167 m (548 ft)
Church tower	<u>Ulm Münster</u>	Germany	Ulm	161 m (528 ft)

Industrial hall	Vehicle Assembly Building	USA	Kennedy Space Center	160 m (525 ft)
Memorial cross	<u>Santa Cruz del</u> <u>Valle de los</u> <u>Caídos</u>	Spain	El Escorial	152.4 m (500 ft)
Educational Building	Moscow State University	Russia	Moscow	240 m (787 ft)
Silo	Henninger Turm	Germany	Frankfurt	120 m (394 ft)
Air-traffic-control tower	KUL Control Tower	Malaysia	Kuala Lumpur	130 m (427 ft)
Light advertisement	Bayer Cross Leverkusen	Germany	Leverkusen	118 m (387 ft)
Wooden tower	Radio Tower Gliwice	Poland	Gliwice	118 m (387 ft)
Support tower of aerial tramway	Pillar of third section of Gletscherbahn Kaprun	Austria	Kaprun	113.6 m (373 ft)



Hurricane Katrina (2005)

The tallest currently those structures which are

# Mars Tension-leg Platform



Mars Tension-leg Platform showing damage from

standing structure, including partially under water, is the

<u>Mars Platform</u> in the <u>Gulf of Mexico</u>, at 990.6 m (3,250 ft). It is a <u>tension-leg platform</u>, meaning that it consists of a deck located atop a hull which is connected to pontoons located far below the water surface, which provide buoyancy support. The structure is connected to foundation piles on the sea floor by rigid tendons, which are analogous to guy-wires. As this <u>oil</u> and <u>natural gas</u> platform is partially supported by <u>buoyancy</u>, some critics argue that the below-water height should not be counted, in the same manner as the underground 'height' of buildings is not taken into account.

The Mars Platform, while still standing and predominantly intact, is currently not functioning due to the effects of <u>Hurricane Katrina</u> in late August of 2005. The platform was engineered to withstand 22 m (72 ft) waves and 225 km/h (120 mph) winds simultaneously; however, winds alone from Katrina were estimated to be in the 265 to 280 km/h (165 to 175 mph) range in the vicinity of the platform. \*\*\*The structural height of the above-deck portion of the platform was temporarily affected by as much as 20 m (65 ft).



KVLY-TV mast

The tallest currently standing structure on land is the <u>KVLY-TV mast</u> near <u>Mayville</u>, <u>North Dakota</u>, at 629 m (2,063 ft). It is a transmission antenna, consisting of a bare <u>metal</u> structure supported by guy-wires. The Warsaw radio mast at Gabin-Konstantynow near Warsaw, Poland

at 645 m (2,115 ft) was taller, but it collapsed on <u>August 8</u>, <u>1991</u>. Masts such as these are generally not considered 'tall buildings', primarilly because they are not self-supporting. They require guy wires to remain upright. For greater detail on communication masts, see either <u>List of the world's tallest structures</u>, <u>List of masts</u>, or <u>Table of masts</u>.

The <u>Petronius Platform</u> stands 610 m (2,001 ft) tall, making it the tallest freestanding structure in the world. However, as this <u>oil</u> and <u>natural gas</u> platform is partially supported by <u>buoyancy</u>, some critics argue that the below-water height should not be counted, in the same manner as the underground 'height' of buildings is not taken into account.

The <u>CN Tower</u> in <u>Toronto</u> stands at 553.33 m (1,815 ft) tall, and it is the tallest freestanding structure above ground.

The tallest tower built of lattice steel is <u>Kiev TV Tower</u> with a height of 386 metres. Built in 1934 and demolished in 1945, the tallest tower ever built of wood was the 190 metre high radio tower of the <u>transmitter Mühlacker</u> in Germany. The tallest tower built of wood is currently the transmission tower of the <u>transmitter Gliwice</u> in <u>Poland</u> at 118 meters.

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### Way of comparison

There are two ways of comparison, the CTBUH way (explained later in this article) and the AA Skyscraper way. <u>All About Skyscrapers</u> (AA Skyscrapers) divided the comparison of structures into seven different categories.

Fully habitable structures - Spire	Taipei 101	Taipei	1,671 ft (509m)
Fully habitable structures - Antenna,	Sears Tower	Chicago	1,736 ft (529m)
Fully habitable structures - Highest Floor,	Taipei 101	Taipei	1,437 ft (438m)
Partially habitable structures - Spire,	CN Tower	Toronto	1,481 ft (452m)
Partially habitable structures - Antenna,	CN Tower	Toronto	1,816 ft (554m)
Partially habitable structures - Highest Floor,	CN Tower	Toronto	1,481 ft (452m)
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## **Tallest buildings**





Up until <u>1998</u> the tallest building status was essentially uncontested. Counting buildings as structures with floors throughout, <u>New York City's World Trade Center</u> was the tallest including the antennas, <u>Sears Tower</u> in <u>Chicago</u> excluding the antennas. As antennas were usually excluded, Sears Tower was counted as the tallest. When <u>Petronas Twin</u> <u>Towers</u> in <u>Kuala Lumpur</u>, <u>Malaysia</u> was built, some felt that the "spire" extending to 9 meters higher than the roof of the Sears Tower was just added to "cheat" its way into the spot as tallest building. Excluding the spire, the Petronas Towers were not taller than the Sears Tower. Therefore, before the Petronas Towers were completed, the <u>Council on Tall</u> <u>Buildings and Urban Habitat</u> defined four categories in which the "world's tallest building" can be measured:

- 1. Height to the structural or architectural top (including <u>spires</u> and pinnacles, but not antennas, masts or flagpoles)
- 2. Height to the highest occupied floor
- 3. Height to the top of the roof
- 4. Height to the top of antenna

The height is measured from the sidewalk level of the main entrance. In all of these categories, Sears Tower had held the top spot. After Petronas was built, Sears Tower became second in the first category only.

On <u>April 20, 2004</u>, the <u>Taipei 101</u> in <u>Taipei</u>, <u>Taiwan</u> was completed. Its completion gave it the record for the first category.

Today, the Taipei 101 leads in the first category with 508 m (1,667 ft); in the second category with an occupied floor at 438 m (1,437 ft); and in the third category with 448 m (1,470 ft). The first category was formerly held by the Petronas Twin Towers with 452 m (1,483 ft), and before that by Sears Tower with 443 m (1,448 ft). The second category was held by the Sears Tower, with 435 m (1,431 ft). The third category was formerly held by the Sears Tower with 442 m (1,445 ft).

The Sears Tower still leads in the fourth category with 529 m (1,736 ft), previously held by the World Trade Center until its <u>destruction</u> in 2001; its antenna included, it measured 536 m (1,758 ft). The World Trade Center became the world's tallest buildings to be demolished–indeed, its site entered the record books twice on <u>September 11</u>, 2001, in that category, replacing the <u>Singer Building</u>, which once stood a block from the WTC site.

The <u>Ostankino Tower</u> and the <u>CN Tower</u> are excluded from these categories because they are not "habitable buildings", which are defined as frame structures made with floors and walls throughout.

Date (Event)	1. Height to the architectural top	2. Height to the highest occupied floor	3. Height to the top of the roof	4. Height to the top of antenna
<b>2003</b> (Completion of <u>Taipei 101</u> )	<u>Taipei 101</u>	<u>Taipei 101</u>	<u>Taipei 101</u>	Sears Tower
<b>2001</b> (Destruction of <u>World Trade</u> <u>Center</u> )	<u>Petronas Twin</u> <u>Towers</u>	<u>Sears Tower</u>	Sears Tower	Sears Tower
<b>1998</b> (Completion of <u>Petronas Towers</u> )	<u>Petronas Twin</u> <u>Towers</u>	Sears Tower	Sears Tower	<u>World Trade</u> <u>Center</u>
<b>1996</b> (CTBUH defines the four categories)	Sears Tower	Sears Tower	Sears Tower	World Trade Center
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#### History of Record Holders in each <u>CTBUH</u> category

# Tallest buildings in world history

Held record		Name and a second label		Height	pht Height	t
From	То	Location	Constructed	(m)	(ft)	Notes
c. <u>2600 BC</u>	c. <u>2570 BC</u>	Red Pyramid of <u>Sneferu</u> , <u>Egypt</u>	c. <u>2600 BC</u>	105	345	
c. <u>2570 BC</u>	c. <u>AD 1300</u>	<u>Great</u> <u>Pyramid of</u> <u>Giza, Egypt</u>	c. <u>2570 BC</u>	146	481	By <u>AD 1439</u> the Great Pyramid had eroded to a height of approximately 139 m (455 ft)
c. <u>1300</u>	<u>1549</u>	Lincoln Cathedral, England	<u>1092–1311</u>	160	524	The central spire was destroyed in a storm in 1549
<u>1549</u>	<u>1625</u>	St. Olav's Church, <u>Tallinn</u> (Reval), <u>Estonia</u>	<u>1438–1519</u>	159	522	The spire burnt down after a lightning strike in 1625, rebuilt several times, current overall height is 123 m
<u>1625</u>	<u>1847</u>	Notre Dame <u>Minster</u> , <u>Strasbourg</u> , <u>Germany</u> , now <u>France</u>	<u>1439</u>	143	469	
<u>1847</u>	<u>1876</u>	St. Nikolaikirche, <u>Hamburg</u> ,	<u>1846–1847</u>	147	483	Designed by George Gilbert

		<u>Germany</u>				Scott
<u>1876</u>	<u>1880</u>	Cathédrale Notre Dame, <u>Rouen</u> , <u>France</u>	<u>1202–1876</u>	151	495	
<u>1880</u>	<u>1884</u>	<u>Cologne</u> <u>Cathedral</u> , <u>Germany</u>	<u>1248–1880</u>	157	515	Still the tallest Gothic spires
<u>1884</u>	<u>1889</u>	<u>Washington</u> <u>Monument</u> , <u>United States</u>	<u>1884</u>	169	555	Still the tallest free- standing stone structure in the world
<u>1889</u>	<u>1930</u>	<u>Eiffel Tower,</u> <u>Paris, France</u>	<u>1889</u>	300	986	The addition of a telecommunications tower brought the overall height to 324 meters in the 1950s
<u>1930</u>	<u>1931</u>	Chrysler Building, New York, United States	<u>1928–1930</u>	319	1046	
<u>1931</u>	<u>1972</u>	Empire State Building, New York, United States	<u>1930–1931</u>	381	1250	
<u>1972</u>	<u>1974</u>	World Trade Center, Tower One, <u>New York</u> ,	<u>1972</u>	417	1368	Destroyed in September 11, 2001 attacks

		United States				
<u>1974</u>	<u>1998</u>	<u>Sears Tower,</u> <u>Chicago,</u> <u>Illinois,</u> <u>United States</u>	<u>1974</u>	442	1451	
<u>1998</u>	<u>2004</u>	Petronas <u>Towers</u> , <u>Kuala</u> Lumpur, <u>Malaysia</u>	<u>1998</u>	452	1483	
<u>2004</u>		<u>Taipei 101,</u> <u>Taipei,</u> <u>Taiwan</u>	<u>2004</u>	508	1668	

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### **Currently-standing tallest skyscrapers**

### Listed by height to the architectural top.

Note that this list, with the exception of the comparison section, is limited to a certain type of structure, and is characterized by a very specific type of height measurement. Most of the tallest structures in the world are guyed broadcasting towers. The structures on this list are *not* sorted by the absolute highest point on the building, due to the nature of the skyscrapers.

			Height to architectural top <sup>1</sup>		
Rank	Name and location	Year completed	m	ft	Stories
1	Taipei 101, Taipei, Taiwan	2004	508	1,668	101

2	Petronas Tower I, Kuala Lumpur, Malaysia	1998	452	1,483	88
(tie) 2	Petronas Tower II, Kuala Lumpur, Malaysia	1998	452	1,483	88
4	Sears Tower, Chicago (IL), United States	1974	442	1,451	108
5	<u>Jin Mao Building, Shanghai, China</u>	1998	421	1,380	88
6	<u>Two International Finance Centre,</u> <u>Hong Kong, China</u>	2003	420	1,377	88
7	<u>CITIC Plaza, Guangzhou, China</u>	1997	391	1,283	80
8	Shun Hing Square, Shenzhen, China	1996	384	1,260	69
9	Empire State Building, <u>New York</u> (NY), <u>United States</u>	1931	381	1,250	102
10	Central Plaza, Hong Kong, China	1992	374	1,227	78
11	Bank of China Tower, <u>Hong Kong</u> , <u>China</u>	1989	368	1,209	72
12	Emirates Office Tower, Dubai, United Arab Emirates	1999	355	1,165	55
13	<u>T &amp; C Tower, Kaohsiung, Taiwan</u>	1997	347	1,140	85

14	Aon Center, Chicago (IL), United States	1973	346	1,136	80
15	The Center, Hong Kong, China	1998	346	1,135	73
16	John Hancock Center, Chicago (IL), United States	1967	344	1,127	100
17	Ryugyong Hotel, Pyongyang, North Korea	1995	330	1,083	105
18	Sky Tower, Auckland, New Zealand <sup>2</sup>	1997	328	1,076	?
19	Burj al Arab Hotel, Dubai, United Arab Emirates	1999	321	1,053	60
20	<u>Chrysler Building</u> , <u>New York</u> (NY), <u>United States</u>	1930	319	1,046	77
21	Bank of America Plaza, <u>Atlanta</u> (GA), <u>United States</u>	1993	312	1,023	55
22	<u>U.S. Bank Tower</u> , <u>Los Angeles</u> (CA), <u>United States</u>	1990	310	1,018	75
23	<u>Telekom Malaysia Headquarters, Kuala Lumpur, Malaysia</u>	1999	310	1,017	55
24	Emirates Towers Hotel, Dubai, United Arab Emirates	2000	309	1,014	56
25	AT&T Corporate Center, Chicago	1989	307	1,007	60

	(IL), <u>United States</u>								
Towers and Other Structures for comparison									
_	KVLY-TV mast, Fargo (ND), United States	1963	629	2,063	_				
1	<u>CN Tower, Toronto</u> (ON), <u>Canada</u>	1976	553	1,815	_				
2	<u>Ostankino Tower, Moscow, Russia</u>	1967	540	1,772	_				

<sup>1</sup> Height for inhabited buildings (with stories) does not include TV towers and antennas. <sup>2</sup> The tallest tower in the Southern Hemisphere.

Source: Council on Tall Buildings and Urban Habitat.

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### **Proposed record-breaking structures**

Chart of progress of buildings currently under construction (as of October 2005)



Urbis Interminatus, 5416 ft (1651 m)

In <u>1956</u>, <u>Frank Lloyd Wright</u> proposed a structure known as <u>The</u> <u>Illinois</u>, which would have been one mile (1609 m) high. This structure was considered by many both technically impossible, and wholly unneeded. Since that time some 4000 ft (1220 m) tall or higher skyscrapers or pyramids have been proposed as population pressures have seemed to indicate a need for them, but as of now, no structure approaching the height of The Illinois is past a planning stage. (See <u>X-Seed 4000</u> and <u>Sky City 1000</u>)

The UK architectural firm, Eric Kuhne and Associates, based in London, is in talks with the Kuwaiti Government about building a 1,001 meter tall tower in Madinat al-Hareer.

The proposed <u>solar chimney</u> referred to as <u>Solar Tower Buronga</u> in <u>Buronga</u>, <u>New South Wales</u>, <u>Australia</u> would be 1,000 m (3,281 ft) tall. Engineering feasibility has been demonstrated to the satisfaction of consulting engineers, and construction is a matter of financial viability.

The 492 m (1,614 ft; roof height) <u>Shanghai World Financial Center</u> in <u>Shanghai</u>, <u>China</u> has proposed completion in 2007, but has been delayed by evaluation of soil stability. A competing on-going project for the world's tallest is the 490 m (1,608 ft) <u>Union Square Phase 7</u> in <u>Hong Kong</u>, also scheduled for completion in 2007. This would make either building the tallest under categories 2 and 3 by the CTBUH.

The <u>Freedom Tower</u> of the new <u>World Trade Center</u> in <u>New York</u> <u>City</u> will reach 1,776 ft (541.3 metres) to its spire and about 1,368 ft (416.9 metres) to its roof once completed in <u>2011</u>. This would make it the tallest building under categories 1 and 4 by the CTBUH, if no other record-breakers were built until then. The cornerstone was laid on <u>July 4</u>, 2004.

The <u>Al Burj</u> and the <u>Burj Dubai</u> are <u>skyscrapers</u> currently under development in <u>Dubai</u>, <u>United Arab Emirates</u>. The final heights for both are unknown, but both will be at least 700 meters (2,296 feet). The Burj Dubai is designed to be completed around <u>2008</u>, whic would put it at the number one spot in all four of CTBUH's categories, as well as make it the tallest manmade structure of any kind in history.

The new <u>Guangdong TV Tower</u> at <u>Guangzhou</u>, <u>China</u> may also become one of the world's tallest structures.

There are some plans for a 609.6 metre high free-standing TV tower at <u>Bayonne, New</u> Jersey.

<u>Maharishi Mahesh Yogi</u> announced his own "world's tallest" proposal, the 677m-tall pyramid-shaped <u>World Centre of Vedic Learning</u>, in 1998.

Serious thought and design work has been invested in a concept called the <u>Space</u> <u>elevator</u>, which could conceivably extend from ground level to well past <u>geosynchronous</u> <u>orbit</u>; a height of 100,000 km. Although the current state-of-the-art in technology cannot produce the materials needed for such an engineering feat, it is likely that it will be built within 25 years, thus shattering the current record for the tallest structure by a factor of almost 200,000.

Throughout the internet many building design proposals can be found, several of which surpass the height of <u>Taipei 101</u>, including <u>Twin Towers 2</u> and <u>Urbis Interminatus</u>.

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### Other proposed very tall towers

#### [edit]

### Radio masts taller than 600 metres

Tower	Pinnacle height	Country	Town	Weblinks
Central Missouri State University Tower Syracuse	609.6 metres	<u>USA</u>	Syracuse, Missouri	[1]
Liberman Broadcasting Tower Sargent	609.6 metres	USA	Sargent, Texas	[2]
Cumulus Broadcasting Tower Winnie	609.6 metres	USA	Winnie, Texas	[3]
American Media Services Tower Agate	609.5 metres	USA	Agate, Colorado	[4]

Vertical Properties Tower Busterville	609.5 metres	USA	Busterville, Texas	<u>[5], [6]</u>
Cumulus Broadcasting Tower Stowell	609.3 metres	USA	Stowell, Texas	[7]
Pegasus Broadcasting Tower	609 metres	USA	Metcalf, Georgia	<u>[8]</u>
SpectraSite Tower Raymond	608.8 metres	USA	Raymond, Mississippi	<u>[9]</u>
Beasley Tower	608.7 metres	USA	Immokalee, Florida	<u>[10]</u>
KKDD-FM Tower	608.1 metres	USA	Hoyt, Colorado	[11]
Liberman Broadcasting Tower Devers	607.7 metres	USA	Devers, Texas	[12]
Wiliam Smith Tower Walker	607 metres	USA	Walker, Iowa	[13]
CBC Real Estate Tower Auburn	606.4 metres	USA	Auburn, North Carolina	<u>[14]</u>
Gray TV Tower Grifton	605 metres	USA	Grifton, North Carolina	[15]
Pappas Telecasting Tower Plymouth County 2	603.5 metres	USA	Plymouth County, Iowa	[16]