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Torre de transmissão

Artigos Tendências +Populares Perguntado por: Carolina Vanessa Antunes Assunção Moura | Última atualização: 14. Fevereiro 2020 Pontuação: 4.6/5 (31 avaliações) Existem quatro grandes categorias para torres de transmissão: suspensão, terminal, tensão e transposição. Qual a diferença entre torre estaiada e autopoortante? As torres de transmissão estaiadas possuem a vantagem de serem estruturas leves e apresentarem um bom comportamento mecânico. Outra vantagem diz respeito ao baixo consumo de aço, se comparado às torres autopoortantes, o que garante menor custo e maior facilidade na instalação.Quanto custa uma torre de transmissão? 5.000.000,00km. O valor total desse tipo de intervenção chega a ser 20 vezes mais caro que a implantação das linhas de transmissão aéreas, fazendo com que o projeto de uma nova torre se justifique. Qual é a função da torre de transmissão? As torres são estruturas cuja função é fazer a sustentação mecânica dos cabos condutores e para-raios, transmitindo todos os esforços mecânicos à fundação. É justamente esse sistema que possibilita a ligação aérea entre as centrais de distribuição de energia e os consumidores. Qual a altura mínima de uma torre de transmissão e qual a Distância mínima entre uma torre é outra? O projeto prevê que as telefônicas compartilharão suas torres para preservar o conjunto urbanístico das cidades. As torres deverão ter altura mínima de 30 metros e estar separadas em pelo menos 500 metros, com um mínimo de seis metros de distância dos lotes vizinhos. FAMILIAS - TIPOS DE TORRES - TENSÕES - CONFIGURAÇÕES - CAPACIDADES MECÂNICAS 26 questões relacionadas encontradas Uma torre de energia eólica funciona transformando a energia cinética dos ventos em força mecânica e, depois, em energia elétrica. O funcionamento de um aerogerador (gerador eólico) começa pelas suas hélices (ou pás), que giram ao contato com a força dos ventos, mas sempre de forma controlada. Torres & Estruturas São componentes com dupla função: fornecem a sustentação do circuito ao mesmo tempo que servem para manter o espaçamento entre cabos condutores e para-raios. Olhando mais atentamente, é possível notar que os cabos são colocados arquetuados ou, como se diz popularmente, "fazendo barriga", a densidade dos cabos tende a diminuir com o passar dos anos, a condução da eletricidade em alta tensão é facilitada desse modo. A estrutura metálica da torre, que pesa 65 toneladas, foi montada em seguida. "Para erguer as peças maiores, que ficam na parte de baixo, um guindaste foi usado até uma altura de 50 metros. Cada linha de transmissão possui um nível de tensão nominal, onde encontramos valores até de 750 kv, com diversos estudos,

que estejam ancorados ao solo ou a outras estruturas. Eles são leves e econômicos, mas exigem uma área maior para instalação devido ao seu tens ionado. Torre de Suspensão: Torres de suspensão são usadas para apoiar os condutores (linhas de energia) em posição horizontal ou ligeiramente inclinada. Elas são projetadas para permitir que os condutores oscilem livremente na direção da linha, que ajuda a acomodar o movimento natural dos condutores devido ao vento, temperatura, e outros fatores. tensão Torre: Torres de tensão, também conhecido como torres de ângulo ou deformação, são utilizados onde o linha de transmissão muda de direção ou elevação. Estas torres são projetadas para suportar mais altas cargas mecânicas em comparação com torres de suspensão. Torre sem saída: Torres sem saída, também conhecidas como torres de ancoragem ou terminação, são utilizadas no final de uma linha de transmissão ou em pontos onde a linha precisa ser ancorada para evitar movimentos excessivos. Essas torres são projetadas para suportar altas cargas mecânicas, pois suportam toda a tensão da linha de transmissão. Cada tipo de torre de transmissão tem suas próprias vantagens e limitações, e a escolha da torre depende de fatores como o terreno, configuração do condutor, nível de tensão, e considerações estéticas. Share – copy and redistribue the material in any medium or format for any purpose, even commercially. Adapt – remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution – You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your material. Non-commercial – You may not apply the terms or license to other materials. You may not distribute your content for commercial purposes. Share-alike – You must apply the same license to any materials you create based on this material. No warranties are given. The licensors may not give you of all the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Torre de Transmissão: fundamentos de estabilidade, análise de carga e princípios de projeto para garantir eficiência e segurança nas telecomunicações.Torre de Transmissão: Estabilidade, Análise de Carga e Princípios de ProjetoAs torres de transmissão são estruturas essenciais no transporte de energia elétrica a longas distâncias. Elas carregam linhas de alta tensão que conectam usinas geradoras às subestações e posteriormente à rede de distribuição. Este artigo explora os conceitos básicos de estabilidade, análise de carga e princípios de projeto das torres de transmissão.Estabilidade das Torres de TransmissãoA estabilidade de uma torre de transmissão é crucial para garantir a segurança e a eficiência operacional da linha de transmissão. A torre deve resistir a diversas forças externas, como vento, gelo e atividades sísmicas. Existem vários fatores que influenciam a estabilidade dessas estruturas:Base Sólida: A fundação desempenha um papel crítico na estabilidade da torre. É geralmente feita de concreto reforçado para resistir a movimentações do solo e outras forças externas.Força dos Materiais: O aço galvanizado frequentemente utilizado nas torres proporciona resistência à corrosão e durabilidade.Forma e Design: O design triangular ou em treliça de uma torre garante que o peso e as forças sejam distribuídos uniformemente, aumentando a estabilidade estrutural.Análise de carga e um componente vital no projeto das torres de transmissão, assegurando que a estrutura possa suportar todos os tipos de cargas.Cargas Verticais: Incluem o peso próprio da torre e as cargas das linhas de transmissão. A solução para essas cargas é a distribuição adequada da linha para garantir a estabilidade mecânica.Torres de Transposição: Usadas em linhas de transmissão de longa distância para alternar a posição dos condutores, equilibram os campos elétricos. Em alguns configurações, uma única torre pode desempenhar múltiplas funções, combinando as categorias acima.[5] As torres de transmissão, juntamente com suas linhas elétricas, são frequentemente vistas como elementos de poluição visual, especialmente em áreas urbanas e paisagens naturais. Para mitigar esse impacto, algumas técnicas são utilizadas, como: Fiação subterrânea – Enterrar os cabos para preservar a estética da paisagem, embora seja uma solução mais cara e complexa. Design inovador de torres – Algumas empresas e governos optam por torres com formatos diferenciados e esteticamente mais agradáveis. Uso de vegetação – A arborização planejada pode ajudar a esconder parcialmente as torres de transmissão.[6] O desempenho das linhas de transmissão é medido pela frequência e duração das interrupções de energia. Um dos principais desafios para a eficiência dessas linhas é a incidência de descargas atmosféricas (raios), que podem causar desligamentos e danos estruturais. No Brasil, linhas de transmissão de até 345 kV são projetadas levando em conta o impacto de descargas atmosféricas. No entanto, devido à elevada resistividade do solo, esse limite pode ser estendido até 500 kV. Para minimizar os efeitos de descargas atmosféricas, são utilizados diversos sistemas de proteção: Cabos para-raios – Instalados no topo das torres para interceptar raios e direcionar sua energia para o solo. Aterramento com cabos contrapeso – Conectados às torres para dissipar a energia das descargas elétricas. Dispositivos para-raios – Equipamentos modernos que melhoram a performance da linha de transmissão ao evitar surtos de tensão.[7] Poste 1 «Torres de Transmissão de Energia». *Met@lica*. Consultado em 13 de Outubro de 2016 1 «Definition - What does Transmission Tower mean? ». *Techopedia*. Consultado em 13 de Outubro de 2016 1 «Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution» (PDF). International Finance Corporation. 30 de abril de 2007. Consultado em 13 de Outubro de 2016 1 «Silvério Visacro Filho, INVESTIGAÇÃO DE CONFIGURAÇÕES OTIMIZADAS PARA O ATERRAMENTO DAS TORRES DO SISTEMA DE TRANSMISSÃO DA CEMIG PARA A FLORIPA DE DESEMPENHO FRENTE A DESCARGAS ATMOSFÉRICAS 1 - Site Anatel» 1 «Organização ONS». «Comissão de segurança». Você pode ajudar a Wikipédia expandindo-o. Editor: considere marcar com um esboço mais específico. Obida de "Structure used to support an overhead power line Transmission towerTransmission tower in Dnipro, UkraineComponent typeStructure, lattice tower and overhead power lineFirst produced20th century A transmission tower (also electricity pylon, hydro tower, or pylon) is a tall structure, usually a lattice tower made of steel that is used to support an overhead power line. In electrical grids, transmission towers carry high-voltage transmission lines that transport bulk electric power from generating stations to electrical substations, from which electricity is delivered to end consumers; moreover, utility poles are used to support lower-voltage sub-transmission and distribution lines that transport electricity from substations to electricity customers. There are four categories of transmission towers: (i) the suspension tower, (ii) the dead-end terminal tower, (iii) the tension tower, and (iv) the transposition tower.[1] The heights of transmission towers typically range from 15 to 55 m (49 to 180 ft).[1] although when longer spans are needed, such as for crossing water, taller towers are sometimes used. More transmission towers are needed to mitigate climate change, and as a result, transmission towers became politically important in the 2020s.[2][3] Pylon in Thirk Transmision tower is the name for the structure used in the industry in the United States and some other English-speaking countries.[4] In Europe and the U.K., the terms electricity pylon and pylon derive from the basic shape of the structure, an obelisk with a tapered top.[5] In Canada, the term hydrotower is used, because hydroelectricity is the principal source of electricity for the country.[6][7] Three-phase electric power systems are used for high voltage (66– or 69-kV and above) and extra-high voltage (110– or 115-kV and above; most often 138– or 230-kV and above in contemporary systems) AC transmission lines. In some European countries, e.g. Germany, Spain or Czech Republic, smaller lattice towers are used for medium voltage (above 10 kV) transmission lines too. The towers must be designed to carry three (or multiples of three) conductors. The towers are usually made of steel (wooden structures are used in Australia, Canada, Germany, and the insulators are either glass or porcelain discs in some cases) and the insulators are attached to a lower cost than building a new transmission line.[9][10] Further information: Traction current pylon Towers used for single-phase AC railway traction lines are similar in construction to those towers used for 110 kV three-phase lines. Steel tube or concrete poles are also often used for these lines. However, railway traction current systems are two-pole AC systems, so traction lines are designed for two conductors (or multiples of two, usually four, eight, or twelve). These are usually arranged on one level, whereby each circuit occupies one half of the cross arm. For four traction circuits, the arrangement of the conductors is in two levels and for six electric circuits, the arrangement of the conductors is in three levels. Transmission towers must withstand various external forces, including wind, ice, and seismic activity, while supporting the weight of heavy conductors. Typical T-shaped 110 kV tower from the former GDR Different shapes of transmission towers are typical for different countries. The shape also depends on voltage and number of circuits. Guyed "Delta" transmission tower (a combination of
guyed "V" and "Y") in Nevada Delta pylons are the most common design for single circuit lines, because of their stability. They have a V-shaped body with a horizontal arm on the top, which forms an inverted delta. Larger Delta towers usually use two guard cables. Portal pylons are widely used in the USA, Ireland, Scandinavia and Canada. They stand on two legs with one cross arm, which gives them a H-shape. Up to 110 kV they often were made from wood, but higher voltage lines use steel pylons. Smaller single circuit pylons may have two small cross arms on one side and one on the other. One level pylons only have one cross arm carrying 3 cables on each side. Sometimes they have an additional cross arm for the protection cables. They are frequently used close to airports, where the reduced height. Danube pylons of Donaumast got their name from a line built in 1927 next to the Danube river. They are the most common design in continental European countries like Germany or Austria. They have two cross arms, the upper arm carries one and the lower arm carries two cables on each side. Sometimes they have an additional cross arm for the protection cables. Ton shaped towers are the most common design, they have 3 horizontal levels with one cable very close to the pylon on each side. In the United Kingdom the second level is often (but not always) wider than the other ones while in the United States all cross arms have the same width. In 2021 the first T-ylon, a new tubular T-shaped design, was installed in United Kingdom for a new power line to Hinkley Point C nuclear power station, carrying two high voltage 400 kV power lines.[11][12] The design features electricity cables strung below a cross-arm atop a single pole which reduces the visual impact on the environment compared to lattice pylons. These 36 T-ylon were the first major UK redesign since 1927, designed by Danish company Bystrup, winner of a 2011 competition from more than 250 entries held by the Royal Institute of British Architects and Her Majesty's Government.[13] Y-ylon with support beam Y-ylons are a newer concept for electrical transmission towers. They usually have a guy-wire or support beam to help support the "Y" shape in the tower.[14][15] Christmas-tree-shaped towers for 4 or even 6 circuits are common in Germany and have 3 cross arms where the highest arm has each one cable, the second has two cables and the third has three cables on each side. The cables on the third arm usually carry circuits for lower high voltage. Branch pylon with a triangular shape Special designed pylons are necessary to introduce branching lines, e.g. to connect nearby substans. Towers may be self-supporting and capable of resisting all forces due to conductor loads, unbalanced conductors, wind and ice in any direction. Such towers often have approximately square bases and usually four points of contact with the ground. A semi-flexible tower is designed so that it can use overhead grounding wires to transfer mechanical load to adjacent structures, if a phase conductor breaks and the structure is subject to unbalanced loads. This type is useful in extra-high voltage lines where phase conductors are bundled (two or more per phase). It is unlikely for all of them to break at once, harring a catastrophic crash or storm. A guyed mast has a very small footprint and relies on guy wires in tension to support the structure and any unbalanced tension loads. Two such structures are used for the Komano-Kitmu Power line, another one can be found near Cape Town at 34.149954 S 18.926239 E. A new type of pylon, called Wintracq pylons, as set to be used in the Netherlands starting in 2010. The pylons were designed as a minimalist structure by Dutch architects Zwarts and Jansma. The use of physical laws for the design made a reduction of the magnetic field possible. Also, the visual impact on the surrounding landscape is reduced.[22] Two crown-shaped pylons appear in Hungary, on both sides of the M5 motorway, near Újhartány.[23] The Pro Football Hall of Fame in Canton, Ohio, U.S., and American Electric Power paired to conceive, design, and install goal post-shaped towers located on both sides of Interstate 77 near the hall as part of a power infrastructure upgrade.[24] The Mickey pylon is a Mickey Mouse shaped transmission tower on the side of Interstate 4, near Walt Disney World in Orlando, FL. Bog Fox is a design pylon in Estonia south of Risti at 58° 59' 33.44" N, 24° 3' 33.19" E. Before transmission towers are even erected, prototype towers are tested at tower testing stations. There are a variety of ways they can then be assembled and erected. They can be assembled horizontally on the ground and erected by push-pull cable. This method is rarely used because of the large assembly area needed. They can be assembled vertically (in their final upright position). Very tall towers, such as the Yangtze River Crossing, were assembled in this way. A jin-pole crane can be used to assemble lattice towers.[25] This is also used for utility poles. Helicopters can serve as aerial cranes for their assembly in areas with limited accessibility. Towers can also be assembled elsewhere and flown to their place on the transmission right-of-way.[26] Helicopters may also be used for transporting disassembled towers for scrapping.[27] International Civil Aviation Organization issues recommendations on markers for power lines and the suspension between them. Certain jurisdictions will make these recommendations mandatory, for example that certain points of the line or the internal designation of the power company) and the tower number. Large height clearance for navigation. Such towers and the conductors they carry must be equipped with flight safety lamps and reflectors. Two well-known wide river crossings are the Elbe Crossing 1 and Elbe Crossing 2. The latter has the tallest overhead line masts in Europe, at 227 m (745 ft) tall. In Spain, the overhead line crossing pylons in the Spanish bay of Cádiz have a particularly interesting construction. The main crossing towers are 158 m (518 ft) tall with one crossarm atop a frustum framework construction. The longest overhead line spans are the crossing of the Norwegian Sognefjord (4,597 m (15,082 ft) between two masts) and the Ameralik Span in Greenland (5,376 m (17,638 ft)). In Germany, the overhead line of the EnBW AG crossing of the Eyachtal has the longest span in the country at 1,444 m (4,738 ft). In order to drop overhead lines into steep, deep valleys, inclined towers are occasionally used. These are utilized at the Hoover Dam, located in the United States, to descend the cliff walls of the Black Canyon of the Colorado. In Switzerland, a pylon inclined around 20 degrees of the vertical is located near Sargans, St. Gallen. Highly sloping masts are used on two 380 kV pylons in Switzerland, the top 32 meters of one of them being bent by 18 degrees to the vertical. Power station chimneys are sometimes equipped with crossbars for fixing conductors of the outgoing lines. Because of possible problems with corrosion by flue gases, such constructions are very rare. However, there are also roof-mounted support structures for high-voltage. Some thermal power plants in Poland like Połaniec Power Station and in the former Soviet Union like Lukoml Power Station use portal pylons on the roof of the power station building for the high voltage line from the machine transformer to the switchyard. Also other industrial buildings may have a rooftop powerline support structure. 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In Switzerland, a pylon inclined around 20 degrees of the vertical is located near Sargans, St. Gallen. Highly sloping masts are used on two 380 kV pylons in Switzerland, the top 32 meters of one of them being bent by 18 degrees to the vertical. Power station chimneys are sometimes equipped with crossbars for fixing conductors of the outgoing lines. Because of possible problems with corrosion by flue gases, such constructions are very rare. However, there are also roof-mounted support structures for high-voltage. Some thermal power plants in Poland like Połaniec Power Station and in the former Soviet Union like Lukoml Power Station use portal pylons on the roof of the power station building for the high voltage line from the machine transformer to the switchyard. Also other industrial buildings may have a rooftop powerline support structure. Beside this, it is also possible that the lower parts of an electricity pylon stand in a building. Such a structure a person, who cannot have a view of the interior of the building, would not be able to see. The tower is usually made of steel (wooden structures are used in some cases) and the insulators are attached to a lower cost than building a new transmission line.[9][10] Further information: Traction current pylon Towers used for single-phase AC railway traction lines are similar in construction to those towers used for 110 kV three-phase lines. Steel tube or concrete poles are also often used for these lines. However, railway traction current systems are two-pole AC systems, so traction lines are designed for two conductors (or multiples of two, usually four, eight, or twelve). These are usually arranged on one level, whereby each circuit occupies one half of the cross arm. For four traction circuits, the arrangement of the conductors is in two levels and for six electric circuits, the arrangement of the conductors is in three levels. Transmission towers must withstand various external forces, including wind, ice, and seismic activity, while supporting the weight of heavy conductors. Typical T-shaped 110 kV tower from the former GDR Different shapes of transmission towers are typical for different countries. The shape also depends on voltage and number of circuits. Guyed "Delta" transmission tower (a combination of guyed "V" and "Y") in Nevada Delta pylons are the most common design for single circuit lines, because of their stability. They have a V-shaped body with a horizontal arm on the top, which forms an inverted delta. Larger Delta towers usually use two guard cables. Portal pylons are widely used in the USA, Ireland, Scandinavia and Canada. They stand on two legs with one cross arm, which gives them a H-shape. Up to 110 kV they often were made from wood, but higher voltage lines use steel pylons. Smaller single circuit pylons may have two small cross arms on one side and one on the other. 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