

Power Pylon

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To survive modern man requires electricity: to work, to cook, to play. Without electricity the laptop, the stove, and the game console will not work. During the darkness of winter what would we do without electric light to extend the day?

In our part of the world, electricity is regarded as a basic necessity. It is a paradox that we cannot imagine living without it while we do not accept the power pylon, which distributes this electricity, as a part of our cultural landscape. “Bury them!” “Camouflage them!” or simply, “Make them go away!” is the general outcry.

But why?

Highways and railroads have been accepted as parts of the landscape; both are necessary in order to travel

and to move. Why then can we not accept the equally vital lines of power pylons?

Is it because the power pylons have been neglected? The well-known lattice tower—an effective and durable construction—is a remnant of a time where cost and functionality were the only parameters in the development. Now darkened by age, they dominate the landscape with visual noise. They have been forgotten; there has been no evolution in their appearance.

Modern man cannot live without electricity, yet compared to other infrastructures in our surroundings, the power pylon has seen the least adjustment to our present conception of landscape. We lull ourselves to sleep with the notion that they can be buried, even though it is a

fact that it will take many years before this process becomes financially and technologically sustainable for high voltage lines at 400 kilovolts and above.

We put significant effort into the design of motorways and railroads, merging them carefully into the landscape. We hire talented designers to create railway stations and to design trains, overhead lines, bridges, and motorway junctions. Ignored are the power pylons that perform another vital function but which most people regard as a threat. They are perceived as messengers of electricity, high voltage, and danger. To some they even symbolize the growing pollution from modern civilization.

What happened to the positive message and celebration of technical progress and infrastructural development brought by modern civilization? Especially now as a new, renewable energy flows through our power grid.

Should we not try to create Overhead Transmission Lines (OHTLs) that dignify the power pylon and restore it as a worthy part of the landscape around us? We could let them radiate the hope and possibilities of sustainable power production.

Transmission grids across the world all face great challenges as we reorganize our energy production to renewable sources. Almost all kinds of sustainable energy utilize the

forces of nature. Wind turbines only turn when the wind blows, photovoltaic cells rely on unobstructed solar rays, and hydroelectric power plants run at full speed only when the snow melts and water runs down the mountains.

We cannot avoid expanding the power grid if we want the capacity to move the energy to where it is needed, when it is needed, thus creating a reliable supply of energy for everyone. It is this change in our electricity production and transmission grids that presents a unique opportunity: the opportunity to make a difference in the landscape and to create new pylons with a strong design profile, allowing power pylons to be an acceptable part of our present as well as our future.

At Bystrup Architects and Engineers, we have been working to develop and design these new power pylons. Our firm’s work in the field of OHTLs began in 2001 when the office won the competition for a new power pylon in Denmark. The pylon was named the “Design Pylon,” as its aesthetic appearance was the main point of focus. As a result of this competition, 80 pylons have been erected between the towns of Bramslev and Haverslev in Jutland, Denmark. Balancing the technicality of installation and the pylon’s aesthetic appearance proved challenging. Had we done the project today, several details would have been different due to the experience and knowledge we now possess.



Mirror Wall, designed for Heia, Norway, utilizes a mirror polish finish



Stealth Pylon, designed for Kasso and Tjele, Denmark

The Design Pylon was an important first step in the evolution towards the power pylons of the future. Since the erection of these first pylons, we have specialized in developing new, high voltage power pylons.

Visiting the office, one can see a significant amount of different designs built as 1:50 scale models. They are everywhere, the archives full of past designs and study models. Some have been developed no further than initial sketches while others will be put into production after they have been thoroughly refined and detailed technically and aesthetically. Essentially, they all seek to answer the same question: “What do we want from the power pylon? Is it a technical necessity, an object of design, or a piece of land art?”

The answer lies somewhere in between these concerns. One of the challenges is to optimize the design according to the project’s technical demands. An object as technically demanding as a power pylon needs to be more than aesthetically pleasing. Not only because faulty high voltage design can be catastrophic

but also because there is a whole range of other demands that need to be met. Demands vary according to voltage and, as a result, the design approach can change. A power pylon designed for 400 kilovolts does not necessarily work at different voltages.

It is important to take the configuration of the conductors into consideration when designing power pylons. The conductors have a significant visual presence as the OHTL moves across the landscape. They are actually as important to organize as the design of the actual pylons.

The importance of conductor layout was examined in the Eagle Pylon project, a 2x400 kilovolts pylon developed for Energinet.dk. Six hundred Eagle Pylons are going to be erected between the towns of Kassø and Tjele in Denmark. The relation between the pylon design and the conductor layout was examined as the pylon was developed in one-, two-, and three-level designs. All three variations were thoroughly examined before a final decision was made to erect the two-level design,

which was regarded as the optimal design in relation to the landscape it is to be a part of.

Another important aspect of power pylon design is the choice of materials. Currently we have far more options through industrial production than we did when the traditional lattice towers were designed. This has broadened the material palette that can be used for power pylons—materials that can be more effective in both erection speed and total cost.

This is one of the reasons our studio has examined such a significant amount of alternatives. It is not because we disregard the well-known lattice structure but present industrial production methods and the negative reaction from the general public towards the lattice towers have made us realize that it might be the right time to explore different approaches that can be competitive on structure, economy, and longevity.

The material choice can have a significant impact on the visual appearance of the new pylons. One of the reasons why the studio has

been working with mirror polished stainless steel is that it reflects the surroundings and can create the illusion of an almost invisible pylon.

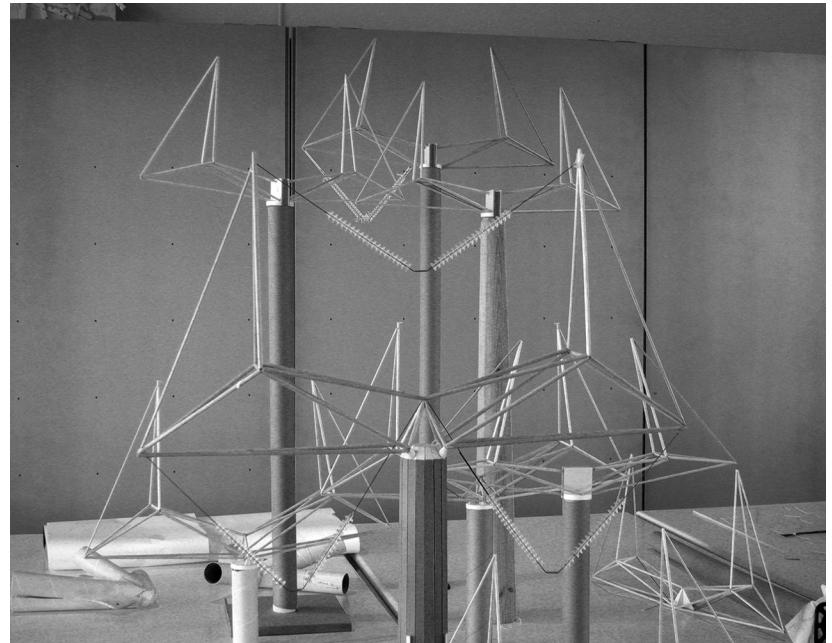
One example of a mirror polished finish is our design for the Stealth Pylon. The Stealth Pylon is part of the progression leading to the Eagle Pylon and it was developed along with and as an alternative to the pylon that is going to be erected between the towns of Kassø and Tjele.

The mirror polished finish can also be seen in the design for the Mirror Wall. The Mirror Wall is a sculptural pylon that won first prize in the competition to design a landscape/art tower at Heia in Norway. It utilizes the reflective finish to act as a mirror of the landscape.

Material-wise, we have also worked with fiber composites, as their insulating properties provide radical new possibilities. A fiber composite power pylon can be designed without traditional insulator chains; since the pylon itself acts as one big insulator, the power pylon can be made visually clean and simple



38 *Design Pylon, designed for Bramslev and Haverslev in Jutland, Denmark*



Design Pylon prototypes, built in the studio



T-Pylon, the winning competition entry for the National Grid in England

thus minimizing the visual impact in the landscape. This material's use as structural members in power pylons is new, but the technique is well known in the production of composite insulators. The right use of the material makes it possible to compress the pylon and minimize the total height, an important factor when looking at the appearance of an entire line of pylons in the landscape. The lower pylons easily hide between forests and hills.

Another way to minimize the pylon's visual impact is to work with the configuration of the conductors. At our office, this was done in our most recently-designed pylon: the T-Pylon. The T-Pylon was an entry to the international competition to create a new power pylon for the National Grid in England, and this fall it was announced as the winner of the competition.

By grouping the conductors into triangles, not only was the height of the pylons reduced, but we also minimized the magnetic field surrounding them. Allowing for a range of materials according to its surroundings, the T-Pylon is a modest power pylon with the capability of blending in to the different landscapes it will traverse.

Each of the described designs demonstrates the possibilities and challenges we face in the expansion of the power grid. Now is the time. Let us, with great care, create a contemporary pylon for modern life and adapt it to its surroundings. Let these power pylons be reminders of the renewable energy that flows through the grid. We owe it to the power pylon, the landscape, and, not least, to ourselves.