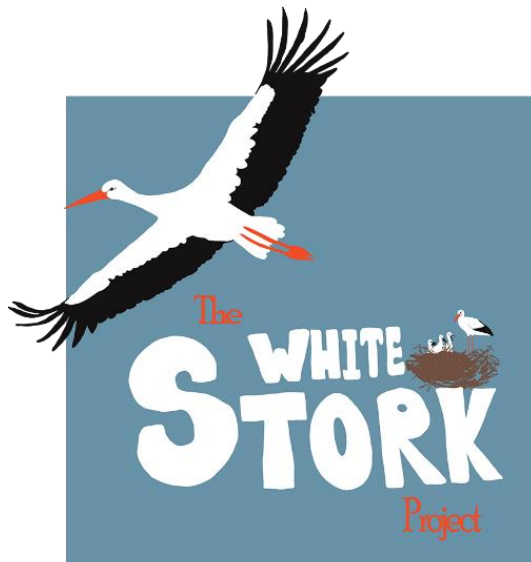


How to Build a White Stork Nest



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Safety: It is essential that when carrying out white stork nest construction that the highest standards of safety are used. All equipment and procedures should follow your necessary risk assessment procedures.

Nature Conservation requirements: You are required to abide by conservation regulations applying to a particular site and, if your nests become occupied, you are required to have the appropriate conservation licences to visit the nests.

1 Introduction

This handbook has been developed by the White Stork Project as a best practice guide for installing white stork nests and nesting platforms.

It includes information about the ecology of white storks, which will be beneficial when considering the site of a nesting platform, and details of how to best construct a safe nest and platform which will increase the likelihood of the site being used by white storks.

White stork nesting platforms and artificial nests have been used for generations across their range in Europe and have been proven to increase the number of breeding pairs and breeding success if sited correctly. We have produced this document utilising advice from experts in Poland, where there are over 40 thousand pairs of white storks.

1.1 White Stork Ecology

1.1.1 Distribution

The white stork was once widely established in Europe, however today, whilst it still has an extensive range, there are large gaps in the distribution. Strongholds are from the Iberian Peninsula to the west and much of eastern and central Europe (*BirdLife, 2021*).

The species has been successfully reintroduced to eight European countries in their former range. The UK is at the very northern edge of this range. White storks are considered to have bred in the UK in some numbers, though the last record of a breeding attempt is from over six hundred years ago. Around twenty to thirty vagrants visit the UK each year, but due to their strong natal and breeding philopatry (returning to the areas they hatched to breed, and then using the same breeding site each year as adults), it was deemed unlikely that they would recolonise naturally (*Gow et al, 2016*).

The White Stork Project is a partnership of private landowners and nature conservation organisations aiming to restore a breeding population of white storks to southeast England by 2030 through a phased release programme over a five-year period. The project saw its first big success in 2020 when four chicks were hatched and fledged in the wild in West Sussex.

1.1.2 Habitat use and feeding ecology

White storks use a range of habitats across their range and migration routes. Wetlands, grasslands, meadows, floodplains, and farmland are the most used throughout the breeding season. They feed primarily on insects and earthworms (up to 30% of their diet) but also forage for amphibians, reptiles, small mammals, and fish (*Antczak et al, 2009*).



Figure 1 – White Storks in grassland ©Kevin Harwood

1.1.3 Migration

White storks migrate south to areas of southern Europe, Morocco, and sub-Saharan Africa for the winter months in search of increased food availability. The migration patterns of storks have changed over recent years due to a variety of factors including climate change and food resources. The white stork is a highly adaptable species and they have made the use of landfill sites in southern Europe and Morocco where there are large sources of organic matter available, some populations have ceased to migrate, instead choosing to remain and breed at these landfill sites (*Gilbert et al, 2016*).

Adults return to nesting sites around February and March, while younger storks will return to the area they hatched to breed themselves once they reach three or four years old (*Bocheński et al, 2006*).

1.1.4 Breeding ecology

Returning to breeding grounds in February and March, adults will usually return to the same nest site year after year. They will repair nests and re-establish their pair bonds before mating. Only sexually mature storks breed, usually when more than four to five years old. The female will lay, on average, 3-5 eggs which hatch after 33 days incubation. Both the male and female take turns to incubate eggs and feed the young. The juveniles fledge at around 60-65 days old and will migrate south later that same year (*Bocheński et al, 2006*). Approximately 70% of individuals do not survive their first migration (*Cheng et al, 2019*).

1.1.5 Use of nest platforms

White storks use prominent trees to build their nests, but since living alongside humans they have made use of buildings and structures. In some areas people have put up purpose-built platforms as nesting sites to attract birds. In areas of Europe, it is seen as good luck to have a stork nest on your roof which leads to many people erecting large cartwheels on their houses and farm buildings (*Czujkowska et al, 2012*).



Figure 2 – White Stork nest on a roof platform in Alsace © Charlie Burrell

Nests are built by breeding pairs in loose colonies and often close to human habitation. The nests are large and solidly built made from sticks and lined with softer nesting material such as grass and mud. They can measure 1-2 metres in depth, 0.8-1.5 metres diameter, and between 60-250kgs in weight (Zbyryt *et al*, 2021).

2 Choosing a location

It is important to consider the ecology and behaviour of the species when considering a suitable site for an artificial nest or nesting platform. The presence of feeding grounds within the vicinity of the nest is extremely important as adults will usually forage within 5km of the nest site (Massemmin-Challet *et al*, 2006). Habitats to consider are wet meadows, floodplains or areas which are periodically flooded, pastures, hay meadows, ponds, and water courses. Cultivated fields and farmland can also provide food sources (Golawski & Kasprzykowski, 2021).



Figure 3 – Image showing White Stork nest in the crown of an oak tree at the Knepp Estate, West Sussex, surrounded by rough grassland and nearby floodplains © Charlie Burrell

Although white storks do nest colonially, competition for nests can be fierce and can lead to injury of one of the paired individuals, or for eggs and chicks to be damaged or lost from the nest. This is more common in areas where food sources are limited or where nests are located too close to each other (*Bocheński et al, 2006*). It is therefore important to consider the location of other nests when siting a new nest platform.

Once an area has been deemed suitable, it is worth keeping in mind that passing storks will see nesting sites from the air, so choosing prominent trees, buildings or an area for a nesting pole will ensure the platform is noticed.



Figure 4 – Aerial of White Stork nest showing how easily they can be seen by passing storks © Penny Green

3 Nest platform construction

Across the white stork's range in Europe, nest platforms have been used for generations. In Poland, since protection of nest sites began in 1980 (*Czujkowska et al, 2012*), thousands of nesting platforms have been installed and therefore testing of the functionality and durability of those platforms has formulated best practice, which is described below.

3.1 Wooden platform

These nesting platforms are constructed from wooden posts which can then be mounted on standalone wooden poles, in trees to resemble natural nests, or on manmade structures such as roofs.

3.1.1 Assembling the wooden platform

The wooden platform is a simple structure approximately 1.2 metres (47") in diameter.

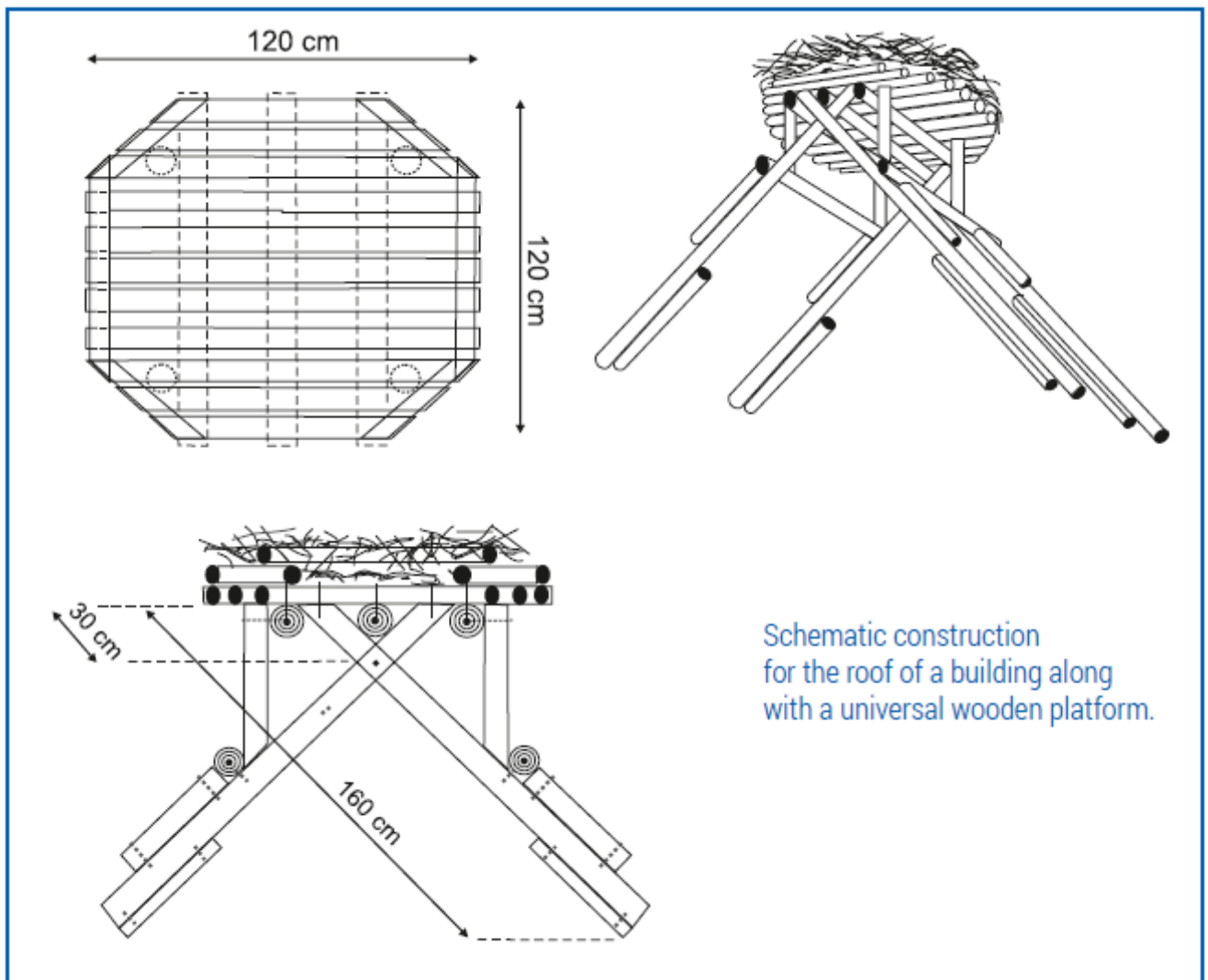


Figure 5 – Construction of the wooden nest platform (Czujkowska et al, 2012)

Materials:

- Wood with a diameter of 7-12cm (3-5") (e.g., pine posts and poles)
- Steel nails 13-18cm (5-7") long (or coach screws)
- Willow branches (or any flexible branches) for the wicker crown
- String or wire

Making the platform:

1. Start with two solid traverse posts, with three solid posts placed in the central section which are nailed together providing structural reinforcement. (See Figure 6a: underside of completed nesting platform)
2. Create a base for the platform by fixing posts perpendicular to the first three posts, 5-10cm from each other.
3. Trim down the edges posts making the base into a circular or octagonal shape
4. Create a side rim by fixing wood around the edge of the platform, to which the crown can be attached. (See Figure 6b: Top of nesting platform, with posts attached to raise the sides)

5. At this stage, the platform should be approximately 20cm (8") deep



Figure 6a: Underside of completed nesting platform showing three posts forming base of structure © Becca Young



Figure 6b: Top of nesting platform © Becca Young



Figure 7a - Mounting the wooden platform in a tree (Czujkowska et al, 2012)



Figure 7b - Mounting the wooden platform on a wooden standalone pole (Czujkowska et al, 2012)



Figure 7c - Mounting the wooden platform on a roof (Czujkowska et al, 2012)

3.1.2 Constructing the nest

It is important to make the nest look as natural as possible once the platform is fitted to the intended site in order to attract white storks. The wicker crown emulates the outside of a nest and is made from flexible sticks and attached to the edge of the platform. This will increase the height of the rim and make a hollow in which a lining can be placed which will resemble a natural white stork's nest.

The wicker crown should be approximately 1 metre (3.3') in diameter, creating an edge at least 30cm (1') above the lining, to prevent it from falling out. To build the crown, use a mixture of larger sticks, up to 50cm (20") in length, and up to 2cm (1") in diameter and flexible shoots of trees, such as willow.

Using poles to weave around:

Drill holes around the edge of the platform and insert thicker sticks into these to act as poles, around which willow can be woven. The distance between poles will depend on the length of willow branches (Figure 8a, 8b, 8c).

Weave a willow ring: Using willow (or other flexible shoots) weave together branches to create a ring (Figure 8a, 8b, 8c). To attach to the platform, drill small holes around the edge through which string can be fed to tie the willow ring onto the platform.

Pile and weave: A crown can be made by simply piling up larger sticks in a ring shape, and weaving them together using more flexible shoots (Figure 8d)



Figure 8a: construction of crown using poles and willow ring method © Lucy Groves

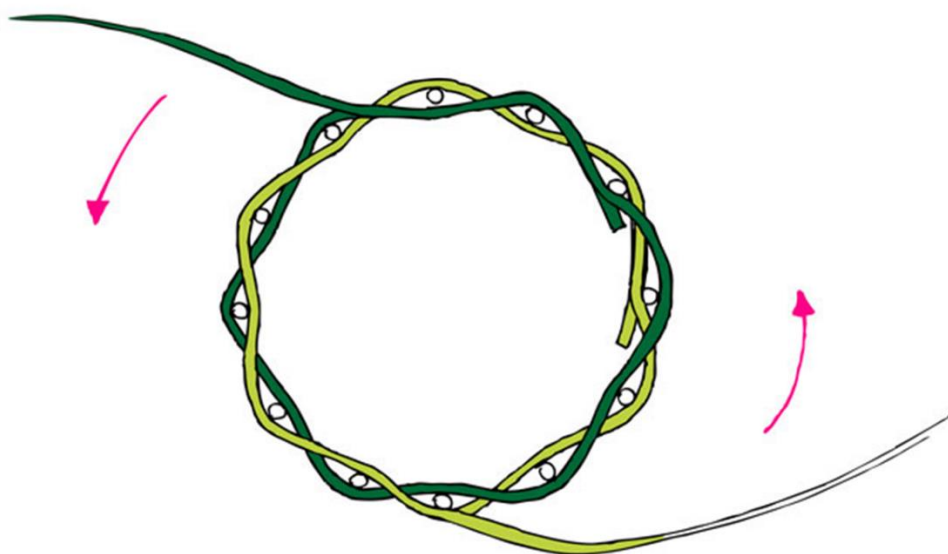


Figure 8b: Line drawing of crown constructure using poles and how to weave willow ring © Jonathan Ridgeon

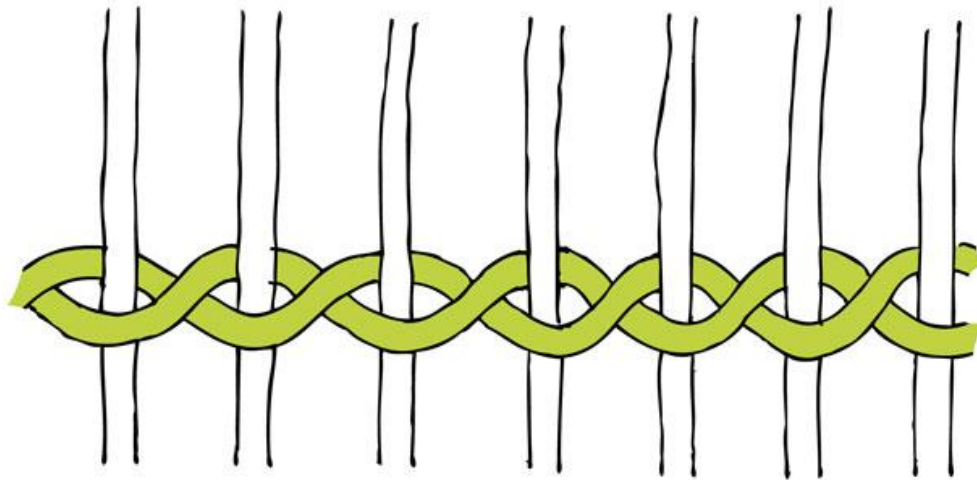


Figure 8c: Line drawing how to weave willow around poles for crown construction © Jonathan Ridgeon



Figure 8d: construction of crown on nesting platform using larger sticks © Lucy Groves

Once the crown has been built, secure it to the nesting platform with string and you are ready to add the lining.

For the lining, consider what kind of nesting materials would be accessible to a white stork, resources such as cut grass and smaller branches. Hay and straw can also make very useful nest lining materials. Storks often use manure to line the inside of their nests too, and following the breeding season, stork droppings and food waste left in the nest degrades and forms an earthy layer (Błońska *et al*, 2020) (Figure 9a), which can be imitated using turf.

First line the nest with the grass, twigs, straw, or hay to provide a padded layer. Then place the turf on top, with the roots pointing upwards. As well as imitating a natural stork's nest, this turf layer will help hold the lining in place during mounting of the platform and in windy weather. The lining can be held even more securely by weaving willow shoots through the crown around the platform, close to the bottom, to push the lining in place.

To make the nest obvious from the air and look more natural and increase the chances of attracting storks, whitewash can be applied around the edges of the nest, to look like faeces excreted by

previous residents. This effect can also be achieved by using light coloured sticks when creating the wicker crown.



Figure 9a – Natural stork nest, demonstrating the lining inside the nest and whitewash © Penny Green

4 Nest site selection

Selecting an appropriate site is important for storks to utilise the nest. Location within the environment with access to adequate food resources and sufficient space from other nesting storks is crucial (see choosing a location pg. 5).

There are then three possible types of nest site to consider:

1. Nesting platforms in trees, resembling natural nest sites (Figure 7a)
2. Nesting platforms on purpose-built poles (Figure 7b)
3. Nesting platforms on buildings (Figure 7c)

4.1 In trees

As the natural nesting sites of white storks, trees are an ideal place to encourage nesting through the use of nest platforms. However, it is important the correct tree is chosen, as it will need to support the weight of the nest and birds inhabiting it, as well as be a shape which provides sufficient support to safely hold the structure. At our sites in Sussex, we have observed that storks have successfully built nests in oak trees, so recommend this species to be considered as a viable option for stork nesting platforms. Photographs of nesting sites are included in Figure 10 to illustrate naturally selected nesting sites. Some of the features observed in naturally built nests are utilising prominent branches, sections broken by wind, and trees with natural forks in the trunks or flat crowns.



Figure 10 – Natural nests, built by white storks at Knepp, illustrating the types of locations they would select in trees © White Stork Project

Platforms mounted in trees should be done in such a way that they are secure and will be able to provide a long-term functional nesting area, without having a detrimental effect on the tree itself.

The optimum location within a tree is in an area of natural embranchment, whereby the boughs of the tree will support the platform. Nesting platforms should not be positioned in an area of tree devoid of living branches so that the nest is in a prominent location. The wooden slats of the platform can be cut to slot into the natural shape of the tree, to provide an optimum fit in the chosen location. If mounting a platform in a tree, keep the following in mind:

- Try to keep the centre of the platform above the vertical tree trunk, or centre of embranchment.
- Aluminium nails used to attach the platform should be long enough to reach the heartwood of the tree.
- If the platform edge protrudes more than 30% beyond the outline of the supporting trunk/branches, additional poles should be used for support to prevent platform tilting
- Avoid using wires/ropes for tree mounting, as these can subsequently damage the tree.
- Platforms should be placed at a minimum height of 8m so as not to encourage low nesting by white storks.

For full information on how to fit a tree platform, see

https://ptasiazyl.zoo.waw.pl/files/1888161202/file/ptop_broszura_bocian_ang2.pdf

4.2 Purpose built poles

Mounting a nesting platform of a purpose-built pole can be a useful alternative if there are no suitable trees to host a nesting platform in the desired area. Setting up a nesting platform on a pole can be dangerous and should be done by skilled workers, with the either a crane, or specialised equipment. The nest platform should be attached to the pole prior to erection, making the structure large and heavy. For this reason, safety when setting up poles is of utmost importance.

For full details on how to put up a nesting platform pole, please refer to https://ptasiazyl.zoo.waw.pl/files/1888161202/file/ptop_broszura_bocian_ang2.pdf or <http://www.roydennis.org/o/wp-content/uploads/2011/10/How-to-build-an-osprey-nest.pdf>

4.3 On buildings and man-made structures

Depending on the building or structure, different requirements will be needed.

Roof mounted platforms: you may wish to create a nesting platform on the roof of a building which will provide a stable place for storks to nest, as well as preventing damage to the building. A double cross of posts is first constructed which will straddle the roof, atop which the platform can sit (see Figure 5, schematic construction for the roof). To increase the durability of posts, particularly in wet weather, ensure posts with a minimum diameter of 10cm (4") are used.

The safest way to fit a roof platform is to construct it fully on the ground, then lower onto the roof using an aerial platform. Whilst it is possible to mount platforms on a roof without an aerial platform, this can be dangerous, unless carried out by a trained professional, as it requires nailing together the structure whilst on the roof.

For full details on how to construct the platform, see https://ptasiazyl.zoo.waw.pl/files/1888161202/file/ptop_broszura_bocian_ang2.pdf

5 Maintenance

It is important that nests and structures are checked in the winter months to ensure that they are in good shape and safe. Following instalment guidelines should help minimise damage such as decay caused by water damage, but some may still need repairs due to wear and tear. Some nests may not be used for many years, but it is worth keeping them in good condition just in case. When the platform is not used by the birds, is not covered by a nest which leads to water damage and decay, and after approximately 6-8 years, the platform will require replacement.

6 Conclusion

Artificial nesting platforms for white storks have been used for generations and have proved highly successful in their range across Europe. Although the English population currently only numbers of handful of breeding pairs, returning young birds will be searching for suitable nesting sites in favourable habitats and, as such, artificial nests will be a valuable means by which to encourage geographical expansion, even if in the early years not every artificial nest is used.

For further information, advice, or queries, please contact us via www.whitestorkproject.org or whitestorksgb@gmail.com

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