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# Datasheet for the decision of 17 November 2015

**Case Number:** T 1089/12 - 3.2.04

**Application Number:** 03704340.3

**Publication Number:** 1476658

**IPC:** F03D11/04, B60P3/40

**Language of the proceedings:** EN

**Title of invention:**
NACELLE AND METHOD OF LOADING A WIND TURBINE NACELLE COMPRISING ONE HUB ONTO A VEHICLE ARRANGEMENT

**Patent Proprietor:**
Vestas Wind Systems A/S

**Headword:**

**Relevant legal provisions:**
EPC Art. 56

**Keyword:**
Inventive step - (no)

**Decisions cited:**

**Catchword:**

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**Beschwerdekammern**
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**Case Number: T 1089/12 - 3.2.04**

# D E C I S I O N
# of Technical Board of Appeal 3.2.04
# of 17 November 2015

| | |
|---|---|
| **Appellant:** (Patent Proprietor) | Vestas Wind Systems A/S<br>Hedeager 42<br>8200 Aarhus N (DK) |
| **Representative:** | Grünecker Patent- und Rechtsanwälte<br>PartG mbB<br>Leopoldstraße 4<br>80802 München (DE) |
| **Decision under appeal:** | **Interlocutory decision of the Opposition Division of the European Patent Office posted on 1 March 2012 concerning maintenance of the European Patent No. 1476658 in amended form.** |

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | A. de Vries |
| **Members:** | J. Wright |
| | T. Bokor |

## Summary of Facts and Submissions

I. The appellant-proprietor lodged an appeal, received 11 May 2012, against the interlocutory decision of the opposition division of 1 March 2012 on the amended form in which European patent no. 1476658 can be maintained and paid the appeal fee at the same time. Their statement setting out the grounds of appeal was filed on 11 July 2012.

The opponent II also lodged an appeal against the above decision. They subsequently withdrew their appeal, together with their opposition, with letter of 10 November 2015. The appellant-proprietor is now the sole party to the proceedings.

II. Two oppositions were filed against the patent as a whole and based *inter alia* on Article 100(a) together with Articles 52(1) and 56 EPC for lack of inventive step. The division held that the patent as amended according to a second auxiliary request met all the requirements of the EPC. In its decision it considered, amongst others, the following documents:

A15: Kevin Smith, "WindPACT Turbine Design Scaling Studies Technical Area 2: Turbine, Rotor, and Blade Logistics" June 2001

A16: Shinya Sasaki and Shinji Shimizu, "The Construction of Tomamae Wind-Villa Wind-power Plant and an Outline of the Plant", June 2001, in Japanese with English translation.

The opponent I withdrew their opposition with letter of 5 January 2009.

III. The appellant filed the following document with letter of 16 October 2015: Excerpt from Vestas V66 Wind Turbine Installation Manual, 3 September 2008, pages 15-17.

Oral proceedings before the Board were duly held on 17 November 2015.

IV. The appellant requests that the decision under appeal be set aside and that the patent be maintained as granted, alternatively that the patent be maintained in amended form according to an auxiliary request, filed during oral proceedings before the opposition division and re-filed in clean copy with letter of 11 July 2012 as auxiliary request 1.

V. The wording of independent claim 10 according to the main request (granted patent), relevant for this decision, is as follows:

"Nacelle (20) comprising releasable attachment means (71,72,27), said attachment means (71,72, 27) being adapted for suspension of said nacelle (20) between at least two wheel sets (21,22) as completely or partly self-supporting suspension, wherein said nacelle is self supporting between said attachment means (71, 72} 27)".

The independent claim 1 according to the auxiliary request reads as claim 10 of the main request except that the wording "or partly" is deleted.

VI. The appellant argued as follows:

A16 discloses transporting a nacelle on a flat bed truck. Therefore, the nacelle claimed differs from that

of A16 in the attachment means claimed and in that it is self-supporting there between. Transporting large objects suspended between two sets of wheels is known to the skilled person, a logistics engineer. They know the associated load height advantages. Formulating the objective technical problem to include aspects related to reducing load height of the nacelle in transport therefore points to the solution claimed. The problem should therefore be formulated more generally as improving transport logistics for a nacelle. The skilled person would not consider transporting a nacelle suspended between wheel sets because it is too big and heavy. It would also be damaged if so transported, as A15 proves. Nacelles are not normally self supporting. They have a chassis from which they can be suspended by crane but would not be otherwise self supporting, so could not be suspended for transport between two wheel sets. Nor would the releasable attachment means for hoisting by crane be suitable for suspended transport on the ground, as the Vestas V66 Wind Turbine Installation Manual shows. If it had been obvious to transport a nacelle by suspension between two wheel sets, this would have been done for transporting the nacelle of A16 through the Obira tunnel, given its dimensions are similar to those of the lower tower section.

## Reasons for the Decision

1. The appeal is admissible.

2. Background

The patent relates to a wind turbine nacelle in particular with regard to its transportation. Typically

the transporting vehicle is a large truck, (patent specification paragraphs [0001] and [0002]). The invention is said to have the advantage of reducing the complete vertical extension or transport height of the vehicle when transporting the nacelle, and improved logistics with respect to known nacelle transportation set-ups such as flatbed transport (patent specification paragraph [0005]). To this end, inter alia, independent claim 10 of the granted patent is directed at a nacelle that is adapted for suspension between two wheel-sets.

3. Inventive step of claim 10 of the main request and claim 1 of the first auxiliary request

3.1 Claim 10 as granted defines, inter alia, that the attachments means are adapted for suspension of the nacelle between at least two wheel sets as a completely or partly self-supporting suspension. Thus the claim defines two alternative nacelles with differently defined attachment means.

3.1.1 In the following the Board will consider only the first alternative (completely self supporting). The nacelle thus defined is the same as that defined by claim 1 of the first auxiliary request, in which the second variant (partly self supporting) is deleted.

The opposition division found the subject matter of this claim, that is claim 1 of auxiliary requests 1 and 2 considered at the oral proceedings in opposition, to lack inventive step in the light of document A16 (see decision, reasons points 5.4 and 6.1).

3.2 It is common ground that A16 represents the closest prior art. A16 discloses a nacelle transported on a flat-bed truck (figure 7). Furthermore it is

indisputable that the nacelle has releasable attachment means, enabling it to be hoisted onto its tower by crane (photographs 7 and 8). However, since these are adapted for suspension from a crane, they are not necessarily suitable for suspension from two wheel-sets as claimed.

The subject matter of claim 1 therefore differs from D1 in that:
- the releasable attachment means are adapted for suspension of the nacelle between two wheel sets as completely self supporting suspension, wherein said nacelle is self supporting between said attachment means.

3.3 Formulation of the technical problem

According to well established jurisprudence, the technical problem addressed by the invention must be formulated so that it does not contain pointers to the solution or partially anticipate the solution. Furthermore, the problem should normally start from the problem described in the patent, see Case Law of the Boards of Appeal, 7th edition, 2013 (CLBA) 4.3.1, and 4.3.2.

In the present case the patent highlights the advantage of, inter alia, reduced height vis-à-vis traditional nacelle transport (see point above). Formulated from the perspective of the patent, this advantage is equivalent to a statement of a problem of needing to reduce overall vehicle or transport height when transporting a nacelle as in A16. It is undisputed that this problem is indeed solved by the claimed invention, which allows the nacelle to be transported between the two wheel sets at a lower level than it would be,say,

on a flatbed. Consequently, and in accordance with established case law, this problem represents a good starting point for formulating at least a part of the objective technical problem in its broadest sense.

The Board is not persuaded that such a problem contains pointers to or partially anticipates the solution. The problem as formulated does not suggest any particular mode of transport and gives no indications of features of the nacelle that might render it suitable for such transport. Similarly, the claim is silent as to the height of the nacelle itself or its height when transported. Nor does a height problem imply, that is inevitably lead to, the claimed solution. It is common ground that the height of a nacelle could also be reduced for transport by splitting it into modules for example, a solution lying outside the scope of the claim. Therefore the Board holds that reducing overall height during nacelle transport forms part of the objective technical problem.

As the appellant has pointed out, the differing features also have logistic advantages (patent specification, paragraph 5). Therefore the objective technical problem can be further refined as how to reduce the overall vehicle or transport height during transportation of a nacelle as in A16 whilst at the same time improving logistics.

3.4 Obviousness of the claimed solution

3.4.1 The skilled person is an engineer specialised in transporting and assembling wind-power installations, who has a wide knowledge of the logistics of transporting large loads. They will therefore be well aware of the options available for transporting large

objects in height critical situations. It is common ground that one well-known option in their tool-kit for reducing load height is to carry the object suspended between two wheel sets, thus achieving a lower clearance than when the object is transported on a flat-bed truck. Such a suspension transport option is indeed used in A16 for the lower tower section, see figure 6. A16, in figure 6 and photo 2 in particular also illustrates a further important known characteristic of this mode of transport, the rigid connection between wheel sets and load at both ends, which give the whole the structural integrity necessary for transport and keep the load off the ground. Finally, the skilled person also knows the logistic advantages inherent to this transportation set-up, namely that after off-loading the object the wheel sets can be coupled together to make a shorter vehicle for the return journey.

3.4.2 The Board holds that, tasked with the above problem, the skilled person would as a matter of course consider this well-known option of slung transport between two wheel sets as one of the options available for reducing load height and improving transport logistics. This is exactly because it is associated with these advantages. In adopting this transport mode they would further, as a matter of obviousness, provide the necessary attachments for the wheel sets to the nacelle to establish the required structural integrity. In so doing they would necessarily arrive at the nacelle as claimed.

Starting from the nacelle of A16, transported on a low-loader flat-bed truck or dolly (translation, page 8, complete paragraph, figure 7 and photograph 3), The bottom of the nacelle sits between wheel-sets, even

lower than the top of the wheels in this kind of truck. Thus the nacelle is already transported close to the ground. If the overall height of the consignment is to be reduced, the possibilities for achieving this are very limited. Either the skilled person must dismantle the nacelle into modules for separate transport or they must adapt the nacelle for transport by the suspension transport method, the height advantages of which being well known to the skilled person. Neither choosing a route without height restrictions for transporting the nacelle, as the appellant has speculated happened in the Tomamae project of A16, nor making a smaller nacelle are solutions to the above problem, but are rather work-arounds to avoid the problem.

Thus the skilled person has but two possibilities for solving the height aspect of the above problem. Each has its own advantages and disadvantages. The first (modular) solution incurring the costs of disassembly and on-site reassembly, the second possibly involving the cost of separate wheel sets and necessary adaptations of the nacelle. However, the board holds that, faced with the height aspect of the above problem, the skilled person will weigh up the particular circumstances and choose one of these two options as a matter of obviousness. Neither choice per se involves an inventive step.

3.4.3 The appellant has argued that the skilled person would dismiss the second (suspension) transport option for a nacelle due to its inherent structural unsuitability for this transport mode. The Board disagrees for the following reasons:

Firstly, the Board is not persuaded that the dimensions and weight of a nacelle would lead the skilled person

to reject this transport option off hand. In A16 the suspension method using a so called "Schnabel pole trailer" was chosen to transport the lower tower section though a restricted height section, namely the Obira tunnel (translation, page 8, full paragraph and figure 6, cf. patent specification figure 2). One can only speculate as to why this mode was not chosen for the nacelle; from the dimensions given in A16 (a height of 4.0 m for the nacelle against 4.028 m for the tower section) and considering the different cross-sections of tower, nacelle and tunnel it can not be excluded that it was physically not possible for the nacelle to go through the tunnel, even when transported suspended. In that case, further reducing the height of the transported nacelle (as compared with the flat-bed truck solution) would not have solved the problem anyway, and therefore would not have been considered. The appellants did not submit any plausible explanation or evidence concerning the dimensions of the Obira tunnel that could have proven the opposite. Finally, whilst it is true that the nacelle has a greater weight than the lower tower section, 56.5 compared to 24.5 tonnes (table 4 as above), the appellant has provided no evidence that might convince the Board of a technical prejudice biasing the skilled person against applying the suspension transport method above a particular weight limit.

3.4.4 Secondly the Board is not convinced that the skilled person would be persuaded by the disclosure of A15 not to contemplate such (suspended) transport of the nacelle of A16, as the appellant has argued. A15 (see page 3-11) discloses that the sudden accelerations and decelerations associated with rail transport may damage a nacelle. If anything this might lead the skilled person to dismiss rail transport as an option, but it

would not lead him to dismiss suspension transport, since this is a form of road transport. Nor does this convince the Board that all nacelles are inherently delicate structures that do not allow of suspended transport.

3.4.5 Thirdly the Board is not persuaded by the argument that the skilled person would reject the suspension transporting option because a conventional nacelle would not be, and could not be readily made self-supporting between suitable attachment means as claimed.

It is common ground that the nacelle is already provided with releasable attachment means for suspending it when lifting by crane (A16, photographs 7 and 8 and Vestas V66 Wind Turbine Installation Manual, figures 10-1 to 10-4).

Once assembled on its tower, the 56 tonne nacelle is not merely supported by its outer skin but indisputably has a chassis, that is a frame that sits on the tower head and which bears the weight of components left and right of the tower head. It must also support the combined 22 tonne weight of the hub and three blades (table 4, second and third rows), to say nothing of withstanding the wind forces to which it is exposed. Thus the nacelle of A16 already has a chassis structure that makes it self-supporting when assembled.

Whether or not the forces the nacelle is subjected to when suspended are different from those to which it is exposed in use and whether or not the hoisting suspension points would be suitable for suspending the nacelle during ground transportation, nacelles must be

strong enough to be self supporting when suspended from a crane.

Furthermore the skilled person knows that, just as for hoisting by crane, any object suspended for ground transport must likewise be self supporting between its attachment means. The contrary would lead to it collapsing under its own weight when transported.

Thus in the worst case, if a nacelle were found to be not self supporting between the points at which the skilled person would first consider attachment for transportation in suspension, then the skilled person would, as a matter of routine search for alternative attachment points where it is self-supporting. The existing chassis frame which provides the main structural support of the nacelle in use is an obvious candidate, as is apparent from its use for hoisting. Adaptation of either the chassis frame or of the wheel sets may prove necessary, but this does not mean that the nacelle is inherently unsuitable for this transport mode and that therefore the skilled person would not even contemplate trying. The nature of adaptations, if any, whether simple workshop or more ingenious, does not play any role in this finding, as the claimed invention does not provide any detail beyond what is a necessary and obvious requirement of the transport mode by suspension, namely attachment means between which the load (the nacelle) is self-supporting.

Far from such a modification being merely within the skilled person's theoretical capabilities, it is essentially no different to what they already do in providing the existing attachment points for hoisting by crane. Therefore in the Board's opinion, the skilled person would not reject the second of the above

transport options (suspension between wheel sets) for a nacelle because of the need to provide suitable attachment points as claimed.

3.4.6 In summary, tasked with the height reduction of the transported nacelle and being faced with the related aspects of the objective technical problem, the skilled person would elect to transport the nacelle suspended between two wheel sets as a matter of obviousness. They will therefore, as an inevitable consequence of this decision, provide the nacelle with releasable attachment means for suspending the nacelle and make it self-supporting between those means, these features being inherent to this type of transportation. Furthermore, by making the obvious choice of this transport option, the skilled person will inevitably achieve the logistic advantages (shorter vehicle when the load is removed) intrinsic to this transportation set-up.

4. In conclusion, the Board holds that the subject matter of both claim 10 of the appellant's main request (patent as granted) and claim 1 of the appellant's first auxiliary request lacks an inventive step, Article 52(1) with 56 EPC. Both requests fail and the Board can but dismiss the appeal.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar: The Chairman:

G. Magouliotis A. de Vries

Decision electronically authenticated