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Datasheet for the decision of 11 September 2025

Case Number: T 1673/23 - 3.2.04

Application Number: 13728545.8

Publication Number: 2834517

IPC: F03D1/06

Language of the proceedings: EN

Title of invention:
TWISTED BLADE ROOT

Patent Proprietor:
Wobben Properties GmbH

Opponent:
Siemens Gamesa Renewable Energy Deutschland GmbH

Headword:

Relevant legal provisions:
EPC 1973 Art. 54, 56
EPC R. 80

Keyword:
Novelty
Inventive step
Amendment occasioned by ground for opposition

Decisions cited:
T 0175/97, T 1186/05, T 0871/08, T 2203/14

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1673/23 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 11 September 2025

Appellant: (Patent Proprietor)	Wobben Properties GmbH Borsigstrasse 26 26607 Aurich (DE)
Representative:	Eisenführ Speiser Patentanwälte Rechtsanwälte PartGmbB Am Kaffee-Quartier 3 28217 Bremen (DE)
Appellant: (Opponent)	Siemens Gamesa Renewable Energy Deutschland GmbH Seewindstraße 4 27572 Bremerhaven (DE)
Representative:	SGRE-Association Siemens Energy Global GmbH & Co. KG SE I IM P Intellectual Property Siemenspromenade 9 91058 Erlangen (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 July 2023 concerning maintenance of the European Patent No. 2834517 in amended form.**

Composition of the Board:

Chairman	G. Martin Gonzalez
Members:	S. Oechsner de Coninck
	M. Millet

Summary of Facts and Submissions

I. The opponent and the proprietor both appeal against the decision of the Opposition Division of the European Patent Office concerning maintenance of the European Patent No. 2 834 517 in amended form.

II. The Opposition Division held that the patent and the invention to which it related according to auxiliary request 3 before it met the requirements of the EPC, having regard in particular to the following documents:

D1: WO 2012/007058 A1
D2: "Upwind 20 MW Wind Turbine Pre-Design", Peeringa et al., ECN-E--11-017; December 2011 - published December 2011
D3: "Simulation of wind energy output at Guajira, Colombia, Mejia et al., Renewable Energy; Volume 31, Issue 3, March 2006, Pages 383-399 - published March 2006

In the present decision, reference is also made to the following document:

D8: T. Burton et al., „Wind Energy Handbook", John Wiley & Sons 2001, ISBN 0-471-48997-2, published 2001.

III. In a communication in preparation for oral proceedings the Board gave a provisional opinion on the relevant issues.

IV. Oral proceedings were held on 11 September 2025 in presence of all parties.

V. The appellant (patent proprietor) requested that the decision under appeal be set aside and to maintain the patent as granted (main request) or on the basis of auxiliary request 1, alternatively to dismiss the opponent's appeal i.e., to maintain the patent according to Auxiliary Request 3 as indicated in the decision under appeal.

VI. The appellant(opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

VII. The independent claim 1 according to the relevant requests reads as follows (with feature numbering added by the Board):

Main request:

"1.1 Rotor blade assembly for a wind turbine which comprises
1.2 a fixation end at longitudinal position L=O for the fixation of the blade to the hub (4) and
1.3 essentially at the opposite end a blade tip (8) at longitudinal position L and
1.4 a suction side, a pressure side, a trailing edge, a leading edge,
1.5 and a thickness at 20%L,
1.6 the assembly having a length L which is larger than 40 meter,
1.7 wherein said assembly comprises 3 degrees twist difference in the longitudinal range smaller than 25%L, and characterized in that
1.8 the thickness at 20%L is more than 45%c."

Claim 1 of auxiliary request 1 adds to granted claim 1 the following feature:

"wherein the largest chord is less than 6.5%L".

Claim 1 of auxiliary request 3 adds to granted claim 1 the following feature:

2.1 "and wherein *said assembly in the longitudinal range limited at one side by 10%L and at the other side by position 25%L, in particular by position 21%L and more in particular by position 15%L comprises 5 degrees, in particular 10 degrees and more in particular 15 degrees twist."*

VIII. The relevant arguments of the parties are addressed in the following reasons for the decision.

Reasons for the Decision

1. Interpretation of claim 1

1.1 A first contentious issue is the interpretation of feature 1.7 especially the terms "twist difference" and the expression "in the longitudinal range smaller than 25%L".

1.2 Contextual reading of the claim indicates to the skilled person that claim 1 attempts to define geometrical limitations of a rotor blade for a wind turbine with reference to its length L between its two ends defined in features 1.2 and 1.3. The length itself has a clear minimum size of 40m. A certain minimum value of thickness at 20% of its length is further defined in features 1.5 and 1.8, to exceed 45%c. For a person skilled in aerodynamics of blades, the parameter length and thickness expressed as a percentage of the chord "c" is quite common.

1.3 Turning to the disputed issue of the expression found on feature 1.7 and giving the terms used their common technical meaning, the terms twist difference would be read by the skilled person as a comparison between a twist at a position as an angle value compared to another angle value of the twist at another position along the length. This difference has to comprise 3° which is therefore understood as a minimum value of the difference or amplitude of variation of the twist angle within a certain range. Thus the relative number of degrees of twist has to be assessed within the range in question, rather than by reference to any zero twist position, including that at the tip of the blade, which, as the appellant-opponent submits, constitutes the customary reference position. Relying on paragraph 007 lines 20 to 22: "The number of degrees of twist in the length direction is called the twist or the twist difference...", the skilled person would confirm their interpretation that the "twist" is equivalent to the "twist difference" both representing a variation of the twist angle within the defined longitudinal range.

1.4 The Board is unconvinced by the interpretation of the considered longitudinal range proposed by the appellant-opponent that any 25%L portion along the whole length of the blade could be meant. Using the same consistent and technically sensible reading, the skilled person having understood that for the definition of a thickness 20%L is a position along the length of the blade, would also follow the same consistent reading and locate "the longitudinal range smaller than 25%L" to the longitudinal range smaller than the position 25%L, i.e. within the first quarter of the blade. The use of the definite article "the" implies a definite - a unique- range smaller than 25%L

that is any position within the extension from the root 0 to 25%L, i.e. the first quarter of the blade as correctly interpreted by the opposition division, item 14.2 of the decision.

2. Main request

2.1 Sufficiency

2.1.1 In relation to sufficiency the Board has expressed its preliminary opinion under point 3.1 of its communication pursuant to article 15(1) RPBA as follows:

"*The question of sufficiency is challenged by the appellant-opponent however while the decision addresses the definition of the parameter "L", the appellant-opponent now appears to change their case by questioning the technical feasibility of the twist as well as the possibility to put into practise all the collection of parameters defined in the claim.*
The appellant opponent does not justify the amendment of their case pursuant Article 12(4) RPBA, nor does the Board recognise any reason for such an amendment, and the Board is thus inclined not to admit such an amendment.

Regardless of the question of its admission, the patent provides at least one example of distribution of thicknesses and twist angles in the first 35% of blade length in figure 13, this would correspond to the at least one way enabling the person skilled in the art to carry out the invention (CLBA II.C.5.2). The appellant-opponent has also failed to submit reasons and thereby raising serious doubts why a twist difference of 3° in the first quarter of a blade length would not be

reproducible by the skilled person, such small variation over a length of at least 10m would not be seen as particularly difficult to realise.

The appellant-opponent appears to repeat their arguments in respect of dependent claims 14 to 16, without however indicating why the opposition division erred in their conclusion. These arguments will thus be disregarded (Article 12(3) and (5) RPBA)."

2.1.2 Absent any further submission, the Board sees no reason to change its provisional view on sufficiency.

2.2 Novelty in view of document D1

2.2.1 Using the above interpretation, a first critical question is whether the difference in twist in the first quarter of the blade disclosed in D1 comprises a value of 3°. D1 discloses a slender blade that exhibits inter alia geometrical values of thickness derivable from table 2 on page 14 and twist disclosed on page 6, lines 14 to 16 ("...between 1.5 and 2.5 degrees.") and shown in the graph of figure 7.

2.2.2 The Board concurs with the patent proprietor (see grounds of appeal, page 7, fourth paragraph) that a direct and unambiguous disclosure of an angle value equal or larger than 3° for the longitudinal range of interest of the rotor blade cannot be directly and unambiguously derived from figure 7 (in the Board's view, between 0.0 r/L and 0.25 r/L the maximum twist difference lies below 2.5 degrees in said graph).

2.2.3 The value of twist angle variation defined in claim 1 is representative of dimensions of a wind turbine blade that set clear cut geometrical and structural

limitations to that blade in terms of twist distribution that should comprise the lower threshold value of 3°. The maximum value of 2.5° of twist variation in the first quarter of the blade which is explicitly disclosed and expressed in D1, page 6, lines 14 to 16, is clearly below this threshold value.

2.2.4 The opposition division used the rounding convention expressed in the guidelines (G-VI, 8.1) to consider that the requirement expressed in feature 1.7 includes an error margin from 2.5 to 3.4, the disclosure of D1 thus anticipating feature 1.7.

2.2.5 The Board disagrees with the finding of the opposition division because the present case simply requires a comparison between clearly expressed and disclosed values. Thus to compare the lower threshold of twist variation or amplitude of 3°, which is an integer value without decimal within the claimed scope no measurement, calculation, conversion of values or any other estimation or approximation is necessary and thus no rounding is required.

2.2.6 The appellant-opponent considers that the same level of accuracy should be applied to the values disclosed in the prior art as in the claim and supports their argument on case law.

2.2.7 The Board is however unconvinced that the case law referred to is applicable in the present case, especially because they concern decimal value of parameters in the field of chemistry requiring measurements on chemical compounds or layer composition. T0175/97 concerns accuracy in weight percentage concentration of a chemical compound within an electrolyte including decimals, thus not applicable

to structural geometrical dimensions of an object as in the present case. In T1186/05 rounding is required because it concerns a third decimal of a density value in the prior art to be compared to a value with only two decimals. T0871/08 is again in the field of chemistry and requires the conversion of units. Finally T2203/14 the measurement of the thickness of a microscopic layer with a certain accuracy is also involved that is to be compared with a value that requires an approximation.
Thus none of these cases can be compared to the geometry on a macroscopic solid object, which defined dimension values are remote from manufacturing tolerances and are explicitly disclosed.

2.2.8 The further argument of the opponent (see letter dated 18 December 2024, page 7, second paragraph) that to compare the disclosure of document D1 with the claimed subject-matter the 2.5 degrees of twist difference disclosed in D1 has to be rounded to the value of 3 degrees to have the same accuracy as the one claimed, can also not be followed.

2.2.9 The effect of this rounding would increase the given value of 2.5 by 20%, well beyond any measurement accuracy limits, and would therefore in the Board's view lead to a misinterpretation and an extension of the disclosure of D1 beyond what a skilled person in the art, familiar with normal workshop practice tolerances, would reasonably understand, and consequently beyond what can be directly and unambiguously derived from D1.
The Board thus is not convinced by this further argument of the opponent that D1 discloses feature 1.7.

2.2.10 However, contrary to the appellant-proprietor's view the Board considers the relative value of thickness to be found in table 2 close to the position r=8 to be clearly disclosed. The Board finds that the graph interpolated from the detailed table 2 with 2m increments, is convincingly represented in the figure drawn in point 16.5 of the appealed decision, and shows a relative thickness of about 45%c at 20%L= 8,426m of D1's LM42.1 P blade.

2.2.11 The Board therefore cannot agree with the finding of the opposition division that D1 discloses feature 1.7 of claim 1, and instead concludes that the subject-matter of claim 1 as granted is novel with respect to D1 by this sole feature.

2.3 Novelty in view of document D2

2.4 D2 discloses a rotor blade design on page 18, section 3.4. The blade is 123m long and shows a twist distribution in Fig. 3.9, with numerical values to be found in a table on page 49, appendix B, it appears that the maximum twist difference in the first quarter from 3m to 33,75m would be between 2.5° to 2.64°, as drawn in the graph on page 21 of the appellant-opponent's grounds. This angle value is clearly below the claimed value of 3 degrees (see the patent proprietor's reply dated 2 April 2024 page 9, first paragraph). For the same consideration in respect of rounding as found for document D1 above, D2 also fails to disclose feature 1.7 of claim 1.

2.5 Lack of inventive step

2.5.1 Considering the sole difference between the subject-matter of claim 1 and D1 is the minor difference in

value of the twist angle expressed in feature 1.7, the Board considers such minor difference in value to lack an inventive step.

2.5.2 Assuming the technical effect of the somewhat increased amplitude of the twist in the root section involves some positive contribution to the yield of the wind turbine, the associated problem of further improving the yield of a wind turbine blade according to D1 may thus be formulated.

2.5.3 Concerning the challenged suitability of D1 as starting point, it is established case law, that the skilled person is free to choose their starting point, cf CLBA, 11th edition 2025, I.D.3.9.

2.5.4 Contrary to the appellant-proprietor's view the Board considers the skilled person would have considered to increase the twist angle from the value of 2,5° to 3° as a straightforward measure to improve the aerodynamic behaviour in the root portion.

2.5.5 Working on the twist and thus improving the lift of the blade aerodynamic profile would be considered as the most obvious parameter to vary by the person skilled in aerodynamics seeking improvement to the yield of a wind turbine and is not therefore based on hindsight. The Board does not deny that the design of the blade in its root region involves other considerations than aerodynamic ones. However in the present case the magnitude of an increment of 0.5° required to reach the threshold value of 3° is so small, that it falls within what a skilled person would routinely consider in normal workshop practice, without anticipating major interactions with other design parameters of the blade of D1, and thus lies within the range that the skilled

person would naturally consider when working around D1's design values.

2.5.6 The Board also disagrees that such minor change in angle of twist constitutes a deviation from the design of D1, because the modification of the twist angle by 0,5° would not be seen as departing from its teaching comprised within a range of twist angles from 1,5° to 2,5°, that is half the width of the disclosed range.

2.5.7 Thus the Board concludes that granted claim 1 lacks an inventive step when starting from D1 in combination with the skilled person's common general knowledge.

3. Auxiliary request 1

3.1 Claim 1 of this request adds to claim 1 as granted the first maximum value of largest chord (i.e. of the blade shoulder: the widest cross-section anywhere along the blade) as follows: "wherein the largest chord is less than 6.5%L".

3.2 D1 discloses a blade shoulder of less than 7,2%L of blade encompassing the claimed sub-range below 6,5%, page 3, lines 5-8. Assuming the claimed range implies an even slender design than the disclosure of D1, the specific claimed upper value is not associated with any particular further technical effect in paragraph 0031 of the patent, which primarily relates to the location of that maximum chord, and mainly refers to known advantages of slender blades design. Contrary to the appellant-proprietor's view this additional feature concerning the chord is not presented in the patent to be related or have any combined effect with the claimed choice of twist angle, so that inventive step can be assessed independently for both features, and cannot be

associated with any other technical effect than a slender blade design. The reduction of the upper limit for the range of the largest chord as suggested on page 3, line 8 of D1 by the small magnitude of 0,7% also constitutes in the Board's view an obvious adjustment that the skilled person working around the design values of D1 would readily contemplate, as submitted by the appellant-opponent.

3.3 Independently from the question of the admission of auxiliary request 1 into the proceedings, the subject-matter of claim 1 lacks an inventive step.

4. Auxiliary request 3 (as upheld)

4.1 Claim 1 of this request adds the following feature 2.1 to granted claim 1:
"said assembly in the longitudinal range limited at one side by 10%L and at the other side by position 25%L, in particular by position 21%L and more in particular by position 15%L comprises 5 degrees, in particular 10 degrees and more in particular 15 degrees twist."

4.2 Concerning the interpretation of this further limitation of the twist angle, the Board disagrees that the use of the term "twist" instead of "twist angle" previously defined in feature 1.7 would be interpreted as values of the twist at the given positions with reference to a zero twist position. Both for internal consistency of the claim as well as pursuing the same sensible interpretation given under item 1.3 above, the refined and more specific variation of the amplitude of the twist angle in a more limited lower portion of the blade has to be understood from this added feature 2.1.

4.3 The appellant-opponent considers this request not admissible under the provisions of Rule 80 EPC because it includes further optional values of twist not aimed at overcoming any raised patentability objection.

4.3.1 The Board firstly follows the patent proprietor (see reply dated 2 April 2024, page 5, point 2.4) that this objection does not appear to have been raised in opposition proceedings and thus not to be admissible pursuant to Article 12(4) and (6) RPBA.

4.3.2 In addition the Board observes that claim 1 now simply adds the features of granted claims 1 and 2 which represents the most straightforward way of further limiting the scope of claim 1. Even though it contains further preferred values, these also define additional embodiment of the same limitation addressing the opposition grounds under Art 100(a) EPC.

4.3.3 Thus independently from its admission, the objection under Rule 80 EPC is not convincing.

4.4 Novelty

4.4.1 Based on the above disclosure content of D1 explained above the twist in the narrower longitudinal range from 10%L to 25%L is 2,5°. This value is far below the required 5° defined in feature 2.1. The subject-matter of claim 1 is thus novel with respect to D1. The appellant-opponent's argumentation is based on the same interpretation of twist in a range between two length positions to represent absolute values of twist with reference to a zero twist position. As explained in point 4.2 above the Board finds such interpretation unconvincing.

The same observations also apply to D2, which also discloses a maximum variation of twist in the root part Close to the hub of 2,64°, also far below the required 5°.

4.5 Inventive step - D1 or D2 as starting points

4.5.1 For both starting points it appears that claim 1 of auxiliary request 3 adds that in the longitudinal range limited at one side by 10%L and at the other side by position 25%L comprises 5 degrees twist.

4.5.2 This minimum twist in the range 10%L to 25%L targets the same part of the rotor centre, and seeks to increase its yield as mentioned in paragraph 008 of the patent, referred to by the appellant-proprietor (point 1.7 of their grounds). The formulation of -further- increasing overall yield, paragraph 30.2 of the decision indeed appears appropriate.

4.5.3 The Board disagrees with the appellant-opponent that the skilled person would have seriously contemplated to increase the variation of twist by such an amount along the more limited range from 10%L to 25%L using their workshop practice. Unlike the small increment of 0,5° twist from 2,5° to 3° as exposed under item 2.5, the modification implies doubling the value of twist disclosed in D1 from 2,5° to 5° over a limited range of 15% of the blade length. The Board considers such a modification to represent a significant departure from the teaching of D1, and thus to exceed the limit of what could reasonably be expected from the skilled person applying routine modification skills to that design. This is especially so as any significant change in geometry of a blade design, such as here the twist, necessarily affects other design parameters such as the

blade thickness or chord close to the root, e.g. to accommodate a different load distribution, which in turn require further adaptation. The skilled person would not consider this as a straightforward adjustment, given the complex interactions between the various parameters.

4.5.4 The Board is also unconvinced that the skilled person would have drawn the teaching of either D3 or D8 into consideration to modify the twist variation along the limited longitudinal portion of the D1's blade. Figure 5 on page 392 of D3 discloses the concurrent optimisation of twist and chord for a specific blade design (LM29.0 configuration), and therefore provides no incentive to adapt any of both parameters to another type of blade design such as LM42.1p or LM40.3p disclosed in D1 and having increased length. D8, for its part, refers to a specific design of linear-tapered blade and does not provide any explanation on particular effects of twist in the portion around the root part.
Thus selectively adopting one particular dimensioning concerning the twist of one type of blade design in D3 or D8 to double the twist increase in the root region disclosed in D1 for another design of blade appears artificial and based on hindsight.

4.6 Inventive step - D3 as starting point:

4.6.1 Document D3 as starting point is a study involving simulation of the power generation output for a particular region, Guajira region of Colombia. These simulations were made using a wind-speed probability distribution function obtained from collected data, see the abstract.

4.6.2 The appellant-proprietor first disputes that D3 discloses rotor blades having a length over 40m because the only rotor blade explicitly mentioned LM 29.0 has a blade radius of 30m. However as pointed out by the appellant-opponent, Figure 10 explicitly presents results of energy densities and capacity factors simulated for rotor diameter up to 90m, therefore including blades larger than 40m. The appellant-proprietor considers these are only theoretical simulations, however the Board observes that under Art. 54(2) EPC, the state of the art comprises everything made available to the public by means of a written or oral description, by use or in any other way. There is no requirement that a disclosure must demonstrably have been put into practice.

4.6.3 Thus the Board also considers feature 1.8, a relative thickness of more than 45%c at 20%L, to be the sole distinguishing feature correctly identified in section 25.5 of the decision.

4.6.4 The appellant-opponent contests the formulation of the objective technical problem proposed by the opposition division in item 25.6 of the appealed decision to increase yield, and rather refer instead to structural strength benefits on page 26 of their grounds and suggests to formulate the technical problem to improve structural strength of the blade.

4.6.5 For the Board, the opposition division correctly relied on the overall yield of the rotor blade, which indeed underlies several considerations on aerodynamics and structural strength in particular explained in paragraphs 0005 of the patent. This paragraph not only mentions the aspect of structural strength required for longer blades but also to optimization from essentially

aerodynamic to essentially structural from the tip to the root. Thus increasing the overall yield of the blade is indeed presented to be based on a relative higher thickness at a relative large radial position, paragraph 030 of the patent, even if as suggested by the appellant-opponent increasing the thickness normally rather concerns structural aspects.

4.6.6 The Board considers that the skilled person would not have objectively contemplated to vary the relative thickness of the blade design disclosed in D3, less so arbitrarily targeting the particular position at 20%L as defined by feature 1.8.

4.6.7 D3 uses a single NACA profile for the simulation, thus having a constant relative thickness. Assuming the skilled person would have contemplated to adapt the profile thickness along the blade length, no particular reason is apparent on the basis of their own technical knowledge or in view of D1 or D2 to depart from the disclosed design with constant relative thickness at any longitudinal position. The values of relative thickness that are disclosed in D1 and D2 are derived from values in graphs and tables with no further indication on their significance or effect direct or indirect on yield. In addition several other geometrical limitations, such as the twist and chord distribution are combined therein to achieve a particular blade design. Therefore, the Board concurs with the appellant-proprietor and the point 27.3 of the impugned decision that extracting any particular portion of the thickness distribution taught by D1 or D2 to apply to the blade of D3 is rather based on hindsight.

4.7 The Board thus confirms the decision of the opposition division that the subject-matter of claim 1 as upheld according to the auxiliary request 3 is novel and involves an inventive step over the cited prior art within the meaning of Articles 54 and 56 EPC.

5. It follows from the above that the Board confirms the opposition division's decision that, considering the amendments made to the patent according to the auxiliary request 3, the patent and the invention to which it relates meet the requirements of the EPC, and that therefore the patent can be maintained as amended, Art 101 (3)(a) EPC.

Order

For these reasons it is decided that:

Both appeals are dismissed.

The Registrar: The Chairman:

G. Magouliotis G. Martin Gonzalez

Decision electronically authenticated