**Internal distribution code:**

(A) [ - ] Publication in OJ
(B) [ - ] To Chairmen and Members
(C) [ - ] To Chairmen
(D) [ X ] No distribution

# Datasheet for the decision of 7 October 2020

**Case Number:** T 1601/17 - 3.2.04

**Application Number:** 06706123.4

**Publication Number:** 1994281

**IPC:** F03D7/04

**Language of the proceedings:** EN

**Title of invention:**
A METHOD AND CONTROL SYSTEM FOR REDUCING THE FATIGUE LOADS IN THE COMPONENTS OF A WIND TURBINE SUBJECTED TO ASYMMETRICAL LOADING OF THE ROTOR PLANE

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

**Opponents:**
Siemens Aktiengesellschaft

**Headword:**

**Relevant legal provisions:**
EPC Art. 54(2), 84

**Keyword:**
Novelty - main request (no) - auxiliary requests 1 and 2 (no)
Claims - clarity after amendment - auxiliary request 3 (no)

**Decisions cited:**

**Catchword:**

Europäisches Patentamt
European Patent Office
Office européen des brevets

**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

**Case Number: T 1601/17 - 3.2.04**

# D E C I S I O N
# of Technical Board of Appeal 3.2.04
# of 7 October 2020

| | |
|---|---|
| **Appellant:** (Opponent 1) | Siemens Aktiengesellschaft<br>Werner-von-Siemens-Straße 1<br>80333 München (DE) |
| **Respondent:** (Patent Proprietor) | Vestas Wind Systems A/S<br>Hedeager 42<br>8200 Aarhus N (DK) |
| **Decision under appeal:** | **Decision of the Opposition Division of the European Patent Office posted on 5 July 2017 rejecting the opposition filed against European patent No. 1994281 pursuant to Article 101(2) EPC.** |

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | C. Heath |
| **Members:** | C. Kujat |
| | J. Wright |

## Summary of Facts and Submissions

I. The appeal lies from the interlocutory decision of the opposition division of the European Patent Office, posted on 5 July 2017 rejecting the opposition filed against European patent No. 1994281 pursuant to Article 101(2) EPC.

II. The opposition division held that the patent and the invention to which it related met the requirements of the EPC, having regard inter alia to the following piece of evidence:

E2: T.G. van Engelen, E.L. van der Hooft, "Individual Pitch Control Inventory", ECN Publication, June 1 2005

III. The appellant opponent 1 lodged an appeal, received on 14 July 2017, against this decision and simultaneously paid the appeal fee. The statement setting out the grounds of appeal was received on 2 November 2017.

IV. In preparation for oral proceedings the board issued a communication dated 17 February 2020 setting out its provisional opinion on the relevant issues.

V. With letter of 21 August 2020, the respondent proprietor withdrew their request for oral proceedings. They did not comment on the board's provisional opinion, and only made reference to their letter of 15 March 2018.

VI. Thereupon, the appellant withdrew their request for oral proceedings before the board in the event that the board maintains its preliminary opinion and revokes the patent. The oral proceedings scheduled for 19 November 2020 were subsequently cancelled.

VII. The appellant opponent 1 requests that the decision under appeal be set aside and that the European patent No. 1994281 be revoked.

VIII. The proprietor as respondent requests that the patent be maintained as granted, i.e. that the rejection of the opposition be confirmed (as Main Request), or in an amended form on the basis of Auxiliary Requests 1-3 filed on 15 March 2018 with their reply to the statement setting out the grounds of appeal.

IX. Independent claim 1 according to the relevant requests reads as follows:

*Main Request (as granted)*

"A method for reducing fatigue loads in the components of a wind turbine (1) subjected to asymmetrical loading of its rotor (6), comprising the steps of: repeatedly collecting and storing load data of the rotor (6), determining a load distribution function for the rotor from said stored data, deriving a plurality of periodic functions from said load distribution function, determining actions for a wind turbine control means (12) for reducing the fatigue load of the wind turbine components from said derived plurality of periodic functions, and implementing said determined actions in the wind turbine control means (12)."

*Auxiliary Request 1 (Auxiliary Request 1 filed before the Opposition Division on 6 October 2014)*

As in the Main Request but with the following amendment underlined by the board:
"...repeatedly collecting and storing load data of the rotor (6), the load data being measured for a predetermined period of time equals 0.5 to 6 full rotations of the rotor, determining a load distribution function ..."

*Auxiliary Request 2 (Auxiliary Request 2A filed before the Opposition Division on 24 January 2017)*

As in the Main Request but with the following amendment underlined by the board:
"... deriving a plurality of periodic functions from said load distribution function, wherein the frequencies of said plurality of periodic functions are different integer multiples of the rotor frequency, determining actions..."

*Auxiliary Request 3*

"A control system (12) for performing the method of reducing the fatigue loads in the components of a wind turbine (1) subjected to asymmetrical loading of its rotor according to any of claims 1 to 8, said control system comprising:
- data collecting and storing means for repeatedly collecting and storing load data(Mr) of the rotor,
- wind turbine control means for controlling the power capture of the wind turbine(1), and

- data processing means for processing said collected load data of the rotor (6) of the wind turbine (1) and providing a control output accordingly,
where said data processing means being adapted to determine a load distribution (Mr) function for the rotor from said stored load data, deriving from said load distribution (Mr) function a plurality of periodic functions (Mr), determining actions, based on said plurality of periodic functions for said wind turbine control means for reducing fatigue loads on the wind turbine components, and providing a control output accordingly to the wind turbine control means."

X. The appellant argued as follows:
The subject matter of independent claim 1 of the Main Request lacks novelty over the disclosure of document E2. Claim 1 of Auxiliary Requests 1 and 2 does not specify any patentable subject matter. Claim 1 of Auxiliary Request 3 depends on itself.

XI. The respondent argued in their letter of 15 March 2018 as follows:

The subject matter of independent claim 1 of the Main Request is novel over the disclosure of document E2, since that document does not disclose features 1.2 and 1.4. In the light of paragraphs [0027] to [0030] of the patent specification, feature 1.2 would extend beyond an intermediate storage of the last obtained load value to load data with a certain temporal extension. With regard to feature 1.4, reference numerals 18 and 20 in figure 9 show examples of load distribution functions expressed by Fourier series. Further, figure 3.1 of E2 neither shows that load data are collected, nor that they are stored, only that they are simulated based on input.

Independent claim 1 of the Auxiliary Requests 1 and 2 are novel over E2, since the amendments in these requests add further details to features 1.2 and 1.4 which are not disclosed in E2.

In Auxiliary Request 3, claims 1 and 8 were deleted. Thus, the claim set only contains claims which were both upheld in opposition and which have not been appealed in a substantiated manner.

## Reasons for the Decision

1. The appeal is admissible.

2. *Background*

The invention concerns a method for reducing fatigue loads in the components of a wind turbine. By determining a plurality of periodic functions (e.g. by means of a Fourier series according to paragraph 72 of the patent in suit) from a load distribution function (i.e. a transformation of the measured blade root loads $m_1$, $m_2$, $m_3$ into a stationary coordinate system $m_{tilt}$ and $m_{yaw}$ according to paragraphs 47 or 56 of the patent in suit), the pitch control system can better adapt to step-like forces. Such forces occur e.g. in a half wake inflow situation (see paragraphs 51 and 69, and compare the invention in figure 10 to the state of the art in figure 6). A corresponding control system is also claimed.

*3. Main Request*

3.1 The appellant disputes the decision's finding that the subject-matter of claim 1 of the Main Request is novel over the disclosure of document E2.

3.2 In its communication, the board was of the preliminary opinion that the subject-matter of claim 1 of the Main Request lacked novelty over E2. The board presented the following preliminary view (see paragraphs 3 and 4.1 of the communication):

*"3. Feature 1.2 ("repeatedly ... storing load data")*

*Before it can evaluate whether the subject-matter of claim 1 is novel, the board must interpret feature 1.2 ("repeatedly collecting and storing load data of the rotor"). In the board's preliminary view, the term "storing load data" seems to be self explanatory in the sense that data is stored in any conceivable way e.g. in the memory of computing means 12. This interpretation, which is based on the literal meaning of the verb "to store" seems to be confirmed by the patent (paragraph 41: "the measured sensor data are supplied to computing means 12", paragraph 42: "the computing means 12 preferably includes ... computer storage means", paragraph 64: "data storage"). In the board's opinion, the term "storing load data" seems to have a clear technical meaning, and thus, the description of the patent in suit cannot be used to interpret that term in a different way, e.g. as being restricted to storing load data with a certain temporal extension. The board is therefore inclined to construe the term "storing load data" without the help of the description, and to include - amongst other things, and*

*contrary to the proprietor's view in its reply to the appeal - storing of the last obtained load value.*

*4.1 Document E2 is directed to individual pitch control of a wind turbine, which seems to imply continuous control (page 17, second paragraph: blade effective wind speeds $u_1$, $u_2$, $u_3$ seem to be continuously measured such that "load histograms ... were derived from six realisations of 800 seconds").*

*With regard to claim 1, E2 seems to disclose a method for reducing fatigue loads in the components of a wind turbine (page 5, paragraph 2) subjected to asymmetrical loading of its rotor (page 5, paragraph 4: "turbulence induced loads"), comprising the steps of*
*- repeatedly (patent, paragraph 27: "measured continuous"; E2, page 7, first paragraph: "blade root moments (blade-associated model inputs)" seems to imply that blade effective wind speeds $u_1$, $u_2$, $u_3$ must be continuously measured for formula 2.2)*
*- determining a load distribution function for the rotor from said stored data (coordinate transformation according to formula 2.10),*
*- deriving a plurality of periodic functions from said load distribution function (page 13, first paragraph: "multiples of the rotational frequency (2p, 3p)"; page 14, last paragraph: "Laplace operator" and page 16, last paragraph : "Floquet theory" seem to imply that the differential equations according to formula 2.9 are solved by means of a Laplace transformation, which seems to involve a plurality of periodic sinus and cosinus functions; page 16, last two paragraphs: "2p and 3p"),*
*- determining actions for a wind turbine control means for reducing the fatigue load of the wind turbine components from said derived plurality of periodic*

*functions and implementing said determined actions in the wind turbine control means (figure 3.1: by means of LTI feedbacks (1), (2) and (3)).*

*The subject-matter of claim 1 of the main request therefore seems to lack novelty over E2."*

3.3 The appellant in their letter withdrawing their request for oral proceedings did not comment on the board's preliminary view. In the absence of such comments, the board sees no reason to depart from its preliminary view. Hence, contrary to the opposition division's finding, the board considers the subject-matter of granted claim 1 to lack novelty over the disclosure of document E2, Article 54 EPC.

*4. Auxiliary Requests 1-3*

4.1 In its communication, the board was of the preliminary opinion that the subject-matter of claim 1 of Auxiliary Requests 1 and 2 also lacked novelty over E2. Further, claim 1 of Auxiliary Request 3 was considered unclear. The board presented the following preliminary view (see paragraphs 5.1 and 5.2 of the communication):

*"5.1 The subject-matter of claim 1 of Auxiliary Requests 1 and 2 seems to lack novelty over E2:*

*Concerning Auxiliary Request 1, E2 already seems to disclose a continuous measurement of load data (see paragraph 4.1 above for details). Claim 1 of auxiliary request is not restricted to load data being measured for a specific time period only, and thus, the continuous measurement in E2 seems to cover the period specified in claim 1 of auxiliary request 1, i.e. 0.5 to 6 full rotations.*

*Concerning Auxiliary Request 2, the multiples 2p and 3p of the rotational frequency disclosed in E11 are considered "different integer multiples of the rotor frequency" (E2, page 13, first paragraph; page 17, first bullet point).*

*5.2 Auxiliary Request 3 does not contain any method claims. The feature "for performing the method of ... according to any of claims 1 to 8" in claim 1 therefore seems to be unclear, Article 84 EPC."*

4.2 The appellant in their letter withdrawing their request for oral proceedings did not comment on the board's preliminary view. In the absence of such comments, the board sees no reason to depart from its preliminary view. Hence, the board considers the subject-matter of claim 1 of Auxiliary Requests 1 and 2 to lack novelty over the disclosure of document E2, Article 54 EPC. Further, the board considers claim 1 of Auxiliary Request 3 to lack clarity, Article 84 EPC.

5. Therefore, the patent must be revoked pursuant to Article 101(3)(b) EPC.

**Order**

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

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:


G. Magouliotis C. Heath

Decision electronically authenticated