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Datasheet for the decision of 27 August 2025

Case Number: T 0399/24 - 3.5.05

Application Number: 19779592.5

Publication Number: 3849871

IPC: B61L23/04, B61K9/08, B61L25/02

Language of the proceedings: EN

Title of invention:
Device for detecting railway equipment defects

Patent Proprietor:
Mer Mec S.p.A.

Opponent:
Goldschmidt Holding GmbH

Headword:
Global severity index/MER MEC

Relevant legal provisions:
EPC Art. 83

Keyword:
Sufficiency of disclosure - (no): claimed invention not disclosed "over the whole range claimed"

Decisions cited:
T 0149/21, T 0867/21, T 2344/22

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Case Number: T 0399/24 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 27 August 2025

Appellant: (Patent Proprietor)	Mer Mec S.p.A. Via Oberdan 70 70043 Monopoli (IT)
Representative:	Wagner & Geyer Partnerschaft mbB Patent- und Rechtsanwälte Gewürzmühlstrasse 5 80538 München (DE)
Respondent: (Opponent)	Goldschmidt Holding GmbH Hugo-Licht-Str. 3 04109 Leipzig (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 18 January 2024 revoking European patent No. 3849871 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	E. Konak
	C. Heath

Summary of Facts and Submissions

I. The appeal was filed by the appellant (patent proprietor) against the decision of the opposition division to revoke the patent in suit (hereinafter "the patent"). The opposition division decided that the patent did not comply with Article 83 EPC.

II. Oral proceedings were held before the board on 27 August 2025. At the end of these oral proceedings, the board announced its decision.

III. The appellant requested that the decision under appeal be set aside and that the opposition be rejected **(main request)**, or, in the alternative, that the patent be maintained in amended form on the basis of the claims of one of **auxiliary requests 1 to 4** filed with the statement of grounds of appeal.

The respondent had withdrawn its opposition without replying to the appellant's statement of grounds of appeal.

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

D': Wilson et al.: "Assessment of safety against derailment using simulations and vehicle acceptance tests: a worldwide comparison of state-of-the-art assessment methods", Vehicle System Dynamics, Vol. 49, No. 7, July 2011, pp. 1113-1157.

V. Claim 1 of the **main request** reads as follows:

"Device for detecting railway equipment defects, comprising:
- at least three diagnostic modules mounted on a generic railway vehicle, of which:
  - a first module, called geometrical module, is configured to measure at least a geometrical feature of the railway;
  - a second module, called acceleration module, is configured to measure in at least a point of said vehicle the lateral and/or vertical accelerations transmitted from the railway to said vehicle;
  - a third module, called visual module, is configured to acquire images of railway elements and to analyze them to verify the presence of anomalies;
- means for detecting the position of the railway vehicle;
- electronical means configured to acquire data detected by said diagnostic modules and to calculate, for each detection carried out by each module, a severity index representative of the deviation of the detection with respect to the standard condition of the railway without defects, characterized in that said electronic means are configured to:
a) calculate for each detection of each module an initial severity index (h_1) indicative of the amplitude of the deviation of the detection with respect to the standard condition without defects;
b) associate to each initial severity index (h_1) a parameter (d_1) indicative of the kind of potential defect;
c) associate each initial severity index (h_1) and respective parameter (d_1) indicative of the kind of potential defect with their acquisition position (x_i), thus defining a potential defect having the characteristics of:

a position (x_i), a kind parameter (d_i) and an initial severity index (h_1);
d) calculate for each potential defect defined in point c) a global severity index (h_t), as a function of said parameter (d_i) indicative of the kind, of said initial severity index (h_1), and of the relative distances (x_{ij}) with respect to other detected potential defects, of their kind parameters and of their initial severity index;
e) compare said global severity index (h_t) with a critical threshold to determine if said potential defect needs a maintenance operation or not."

VI. Claim 1 of **auxiliary request 1** differs from claim 1 of the main request in the addition of the following wording:

"; and characterized in that said global severity index (h_t) is given by the sum of:
- said initial severity index (h_i) and of
- a contribution relative to each potential defect detected in a predefined area close to said position (x_i) of said defect for which the global severity index (h_t) is calculated."

VII. Claim 1 of **auxiliary request 2** differs from claim 1 of auxiliary request 1 in the addition of the following wording:

"; and characterized in that said contribution relative to each potential defect (h_j) detected in a predefined area close to said detection position (x_i) of said defect for which the global severity index (h_t) is calculated is given by the product of the severity index (h_j) of said potential defect multiplied by a

term which is a function of the relative distance of said two defects (x_{ij}) and of said kind parameters of the two defects (d_i, d_j)."

VIII. Claim 1 of **auxiliary request 3** differs from claim 1 of auxiliary request 2 in the addition of the following wording:

"; and characterized in that said term function of the relative distance of said two defects (x_{ij}) and of said kind parameters of the two defects (d_i, d_j) is calculated as negative exponential of the ratio between the distance of the two defects (x_{ij}) and an amplification coefficient (a_{ij}), function of said kind parameters of the two defects."

IX. Claim 1 of **auxiliary request 4** differs from claim 1 of auxiliary request 3 in the addition of the following wording:

"; and wherein said visual anomalies detected by means of said visual module comprise at least an anomaly selected among: absence or anomaly of couplings, joints anomaly, insufficient quantity of crushed stone, absence or loosening of sleeper screws for sleepers and track bolts for joints, presence of fractures on sleepers and rails or any other morphological anomaly of the elements constituting the equipment."

Reasons for the Decision

1. Main request - sufficiency of disclosure

1.1 The opposition division came to the conclusion that the patent does not disclose **feature d)** of present claim 1

in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art within the meaning of Article 83 EPC.

1.2 On a general note, the appellant, referring to a selected body of case law of the Boards of Appeal, contended that, "where the application discloses the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, that application then necessarily discloses at least one way of carrying out the invention claimed in accordance with Rule 42(1)(e) EPC".

In that regard, the board has to recall that, according to the case law already cited in Reasons 4.3 of the appealed decision, i.e. **T 149/21** (Reasons 3.6) and **T 867/21** (Catchword), disclosing "one way of carrying out the claimed invention" under Rule 42(1)(e) EPC is a necessary condition but not a sufficient one to satisfy the requirement of Article 83 EPC "over the whole range claimed" (see, moreover, **T 2344/22**, Reasons 2.2.2, referring also to decisions of the UPC).

1.3 As to the present case, the appellant argued, first, that the opposition division's conclusion was based on the erroneous belief that only one overall "severity index" was determined by the invention.

The board, however, cannot derive this from the contested decision (see Reasons 4.3). The opposition division seems to have merely made an observation that the use of the adjective "global" is not very accurate in the case at hand, since feature d) requires the calculation of a so-called "global severity index" for *each* "potential defect", meaning that the number of

"global severity indices" is equal to the number of "potential defects".

1.4 In addition, the appellant suggested a "slightly restructured/rephrased" and "cross-linked version" of feature d).

In the board's view, this way of reading feature d) can neither grammatically nor technically be derived from the wording of feature d), which reads as follows:

> *"**calculate** for each potential defect defined in point c) **a global severity index, as a function** of said parameter indicative of the kind, of said initial severity index, and of the relative distances with respect to other detected potential defects, of their kind parameters and of their initial severity index;* [board's emphases]".

Thus, feature d) clearly requires that the "global severity index" (one for *each* "potential defect") be calculated "as a function of" at least five parameters, namely:

(1) said parameter indicative of the defect kind (referring to "a parameter indicative of the kind of potential defect" calculated in step b),

(2) said initial severity index (referring to "an initial severity index" calculated in step a),

and *for each other* "potential defect"

(3) its relative distance to the potential defect for which the "global severity index" is being calculated,

(4) its kind parameter (corresponding to "the parameter indicative of the kind of potential defect" calculated in step b) for that other "potential defect"), and

(5) its initial severity index (corresponding to "an initial severity index" calculated in step a) for that other "potential defect").

1.5 The board agrees with the contested decision that the opposed patent does not disclose how to calculate a "global severity index" for any number of detected "railway defects" in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC). The patent indeed does not disclose any mathematical function which has *five* input parameters.

1.6 More specifically, Equation (1) in paragraph [0044] of the patent description, i.e. $h_t = F\ (d_i, h_i, x_{ij})$, refers to *three* input parameters, namely d_i, h_i and x_{ij}. Thus, it is disqualified from the very beginning as a basis for enablement.

The appellant argued that Equation (1) was a logical - and not necessarily a mathematical - function to assess the synergistic effect of a plurality of effects, which should therefore be sufficient for the skilled person to carry out the invention. As a logical function, it would *enable* the skilled person to consider at least *five* input parameters or to apply it to *any* number of different defects without undue burden. However, the board cannot understand how an abstract logical function which merely expresses the basic idea of taking into account the synergistic effects of defects

on each other, could be a basis for *enablement*.

1.7 Moreover, the example mathematical function indicated in Equation (2) in paragraph [0046] has *four* parameters (i.e. h_1, h_2, x_{12} and a_{12}), which disqualifies it, too, at first sight.

In its statement of grounds of appeal, the appellant expressed this equation as follows:

$$h_t = h_1 + e^{-x12/a12} \cdot h_2 = F(h_1, h_2, a_{12}, x_{12}).$$

In this equation, parameters h_1, h_2 and x_{12} correspond respectively to parameters (2), (5) and (3) listed in point 1.4 above. The appellant then explained that the dependency on the "kinds of defects" d_1 and d_2 (corresponding to parameters (1) and (4) listed in point 1.4 above) was taken into account by means of the parameter "amplification coefficient a_{12}". Therefore, parameter a_{12} could potentially be seen as a function of d_1 and d_2, and the function given in paragraph [0046] of the patent description as an example function in order to carry out feature d).

1.8 The next question would be whether the patent sufficiently discloses how to assign the parameter "amplification coefficient a_{12}" as a function of d_1 and d_2. In this regard, the patent merely states in paragraph [0047], last sentence, of its description that

> "*[t]his coefficient quantifies the synergic effect of the distance between two aggregated defects; therefore, it will be higher when the synergic effect of the second defect vanishes rapidly with the distance*".

In addition, in paragraph [0054] of the patent, an example is given

> "*[...] by assuming an amplification ratio a_{12}=2 for combined presence of a defect kind d_1 = rail gauge defect and a defect kind d_2 = absence of couplings [...]*".

However, it does not further disclose how the skilled person is supposed to assign this value a_{12} for *other* combinations of different kinds of defects.

1.9 In its letter of reply to the board's preliminary opinion, the appellant argued that parameter a_{12} was not necessary to carry out the invention of claim 1 of the main request, as a_{12} was an optional feature which appeared only in dependent claim 4. The board cannot endorse this argument for two reasons. First, this argument amounts indeed to arguing that, if an invention is not sufficiently disclosed, it is not the claimed invention according to claim 1 but the claimed invention according to claim 4, which would not change the finding that the opposed patent does not comply with Article 83 EPC. Second, the board actually delved into the matter of sufficiency of disclosure with regard to the parameter a_{12}, as the appellant had alleged in its statement of grounds of appeal that Equation (2) would actually be a basis for enablement.

1.10 The appellant argued that the skilled person would know the proper value to assign to parameter a_{12}. Since each couple of different "defect kinds" had a different synergistic effect, a proper value had to be assigned to parameter a_{12}. An expert in the field of assessing railway safety risks would further know that a combination of a large gauge with the absence of bolts

is more dangerous than the combination of a large gauge with a level defect. Therefore, they would assign a *larger* value to parameter a_{12} in the first case with respect to the second one.

However, merely knowing that one value should be bigger than the other one does not help much to assign these values *properly*. As to the assignment of the *proper* value to parameter a_{12} as a function of different pairs of "defect kinds", the patent is silent.

1.11 The appellant further argued that the board erred in thinking that the skilled person's common general knowledge would be limited to the disclosure of the patent.

However, this arguments fails to succeed, since the board had already indicated in its preliminary opinion that it was not convinced that the skilled person could carry out the claimed invention merely on the basis of their common general knowledge.

1.12 Regarding the common general knowledge in the relevant art, the appellant argued that the skilled person was aware that there were different known methods to define the value of a_{12}, for example, according to internal procedures of railway companies or based on safety standards related to the critical kinds and levels of multiple defects.

Yet, the appellant could not show any publicly available procedure of railway companies or safety standard that provides a list of "amplification coefficients" for different combinations of defects.

1.13 The appellant also argued that another approach to implementing feature d) was based on the calculation of the probability of derailment which was related to the acceleration level transmitted by the defect railway track to the vehicle and could be calculated by means of commercial simulation software such as Vampire Pro, COMSOL or ANSYS. As an exemplary proof for a skilled person's common general knowledge, the appellant referred to document **D'** (see point IV above), which gives a review describing different assessment procedures to evaluate derailment risks in various countries. It could be seen that the assessment was made based on simulation and/or field tests.

However, the appellant was not able to show that these simulation software tools readily provide a list of "amplification coefficients" for *different* combinations of defects.

1.14 In view of the above, the main request does not comply with Article 83 EPC.

2. Auxiliary requests 1 to 4

2.1 Claim 1 of **auxiliary requests 1 to 4** successively add features from dependent claims of the main request, which were meant to clarify the invention by giving more details on how the "global severity index" is calculated and based on which parameters.

Yet, adding further limiting features from dependent claims (see points VI to IX above) cannot remedy the fact that the patent does not comply with Article 83 EPC due to a lack of sufficient disclosure on the calculation of the so-called "global severity index"

for any number of detected railway defects. Nor did the appellant argue otherwise.

2.2 Thus, auxiliary requests 1 to 4 do not comply with Article 83 EPC, either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated