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**D E C I S I O N**  
**of 27 June 2002**

**Case Number:** T 1001/99 - 3.2.3  
**Application Number:** 94914678.1  
**Publication Number:** 0698152  
**IPC:** E01C 19/28, E02D 3/046

**Language of the proceedings:** EN

**Title of invention:**

Method and device for measuring the compaction degree of a surface

**Applicant:**

GEODYNAMIK HT AKTIEBOLAG

**Opponent:**

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**Headword:**

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**Relevant legal provisions:**

EPC Art. 52, 56

**Keyword:**

"Patentable invention - examination of the claims as a whole,  
not of any "contribution" to the prior art"  
"Inventive step - (yes) after amendment"

**Decisions cited:**

T 0931/95

**Catchword:**

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**Case Number:** T 1001/99 - 3.2.3

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.3**  
**of 27 June 2002**

**Appellant:** GEODYNAMIK HT AKTIEBOLAG  
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**Representative:** Rosenquist, Per Olof  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 28 July 1999  
refusing European patent application  
No. 94 914 678.1 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** C. T. Wilson  
**Members:** U. Krause  
J. P. B. Seitz

## Summary of Facts and Submissions

- I. The appeal contests the decision of the Examining Division dated 28 July 1999 refusing European Patent application No. 94 914 678.1 as being concerned with a mental act, thereby relating to subject-matter which is excluded from patentability under Article 52(2)c) EPC.
- II. The Appellant (Applicant) filed the notice of appeal, together with a statement of the grounds of appeal, on 4 October 1999, and paid the appeal fee on the same day.

With communication dated 16 January 2002 the Board informed the Appellant of its preliminary opinion that the provisions of Article 52(2)c) EPC did not preclude the invention from being patentable, and required a modification of the independent claims in order to clearly distinguish the claimed subject-matter from the prior art.

In response to this communication the Appellant submitted an amended set of claims 1 to 19 comprising independent claims 1, 2 and 13 having the following wording:

"1. A method of determining the compaction degree of a segment of a deposited layer of hot material, in particular asphalt, which continually cools after the deposition thereof and is compacted by being repeatedly passed by a compacting machine (2), the method comprising measuring for each pass of the segment values defining a compaction effect and determining, on the basis of the measured values, a partial compaction effect or partial index number for this pass and

segment, and determining, as a measure of the compaction degree of the segment, the total compaction effect or a total index number of the segment as the sum of the partial compaction effects of partial index numbers respectively of the segment for all the passes made."

"2. A method of controlling a compacting machine (2) compacting a segment of a deposited layer of hot material, in particular asphalt, which continually cools after the deposition thereof and is compacted by being repeatedly passed by a compacting machine (2), the method comprising measuring for each pass of the segment values defining a compaction effect and determining, on the basis of the measured values, a partial compaction effect or partial index number for this pass and segment, and determining, as a measure of the compaction degree of the segment, the total compaction effect or a total index number of the segment as the sum of the partial compaction effects or partial index numbers respectively of the segment for all the passes made, and controlling the travel of and operational parameters of the compacting machine (2) using the total compaction effect or total index number to make the total compaction effect or total index number at least achieve a predetermined value for the segment."

"13. A device for determining the compaction degree of a segment of a deposited layer of hot material, in particular asphalt, which continually cools after the deposition thereof and is compacted by being repeatedly passed by a compacting machine (2), the device comprising  
- first means (3-12) for measuring, for each pass of

the segment, values defining a compaction effect, and  
- determining means (1) for determining, on the basis of the measured values, a partial compaction effect or partial index number for this pass and segment, and for determining, as a measure of the compaction degree of the segment, the total compaction effect or a total index number of the segment as the sum of the partial compaction effects of partial index numbers respectively of the segment for all the passes made."

III. The Appellant requests that the decision under appeal be set aside and that the application be further processed on the basis of

- claims 1 to 19 submitted with letter of 17 May 2002
- description pages 1 and 3 to 17 of the application as filed and pages 2, 2a, 2b submitted with letter of 25 September 1997
- drawing sheets 1/5 to 5/5 as originally filed.

IV. The appeal is supported by the following arguments of the Appellant:

The subject-matter of the independent claims involved making measurements for each pass of a compacting machine and determining, from these measurements, a value significant of the total compaction degree. Whereas the latter step could be performed by a program run on a computer, a technical character of the invention resulted from the measurements which could not be attributed to a pure mental act. Thus, the invention could be considered as a combination of

mental acts with technical features. Since an invention had to be considered as a whole, the technical features could not be disregarded.

## **Reasons for the Decision**

1. The appeal meets the requirements of Articles 106 to 108 EPC and of Rules 1(1) and 64 EPC and is, therefore, admissible.
2. *Amendments (Article 123(2) EPC)*

The amended set of claims comprises independent claims 1 and 13 which are based on a combination of original claims 1, 2 and 11, 12, respectively, with the further specifications of measuring the values defining a compaction effect and summing the partial compaction effects or index numbers which are supported by the two bottom paragraphs on page 3 and on page 12, first paragraph, as well as page 13, second paragraph, respectively.

The later added independent claim 2 is based on original claims 1, 2 and 7 with the same additional specifications as in claims 1 and 13.

Whereas dependent claims 5 to 12 and 16 to 19 correspond to original claims 3 to 10 and 13 to 16 whereby the original claim 5 is split into the new claims 7 and 8, claims 3, 4 and 14, 15 have been added to the original claims. The operational parameters defined in claims 3 and 14 correspond to the changeable or constant parameters of the compacting machine referred to at the bottom of page 11 and on page 13,

lines 24/25 and 30/31, and the reduction of the partial compaction effect or index number for each pass, as defined in claims 4 and 15, is described in detail on page 14, in particular in the last six lines of the penultimate paragraph.

Concerning the description a paragraph describing document US-A-4 103 554 as closest prior art (new page 2a) has been inserted on original page 2 which is split into new pages 2 and 2b.

No objection under Article 123(2), therefore, arises in respect of the application as on file.

3. *Patentability (Articles 52(1), (2) and (3) EPC)*

3.1 Pursuant to Article 52(1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step. The EPC does not provide a positive definition for the meaning of the term "invention" but gives an indication by excluding from patentability, in Articles 52(2) and (3), certain non-technical subject-matter or activities, such as methods for performing mental acts, to the extent to which a European patent application or European patent relates to such subject-matter or activities as such. This provision primarily concerns the claims which shall, pursuant to Article 84 EPC, define the matter for which protection is sought. Thus, it has to be determined whether the subject-matter of the claims relates to an invention within the meaning of Article 52(1) EPC or to subject-matter excluded from patentability, as defined in Article 52(2) EPC, as such.

3.2 The Examining Division held that the independent claims then on file were excluded from patentability according to Article 52(2)c) EPC essentially for the reason that the contribution of the subject-matter of these claims to the known art was to be seen in determining a total index number as an undefined function of the variable values of all passes made, which contribution was concerned only with performing a mental act or a program-controlled internal working of a known computer.

This concept of identifying the "contribution to the prior art" and examining whether or not this contribution is of a technical character, as set out in the Guidelines C-IV, 2.2, is misleading because it suggests that only part of the claim, namely the features distinguishing the claimed subject-matter from the prior art, should be examined as to whether it is an invention within the meaning of Article 52(1) EPC by reference to the examples listed in Article 52(2) EPC. The Board follows the conclusion drawn in decision T 931/95 (OJ 2001, 441) that the EPC provides no basis for such a partial consideration of the claims. In fact, there is no basis for distinguishing between the subject-matter of a claim to be examined as to whether it is an invention and another subject-matter of the same claim to be examined for the other substantive requirements of Article 52(1) EPC, i.e. novelty, inventive step and susceptibility for industrial application. In all cases it is the entire claim, including all its features, whether known or unknown, technical or non-technical, which has to be taken as a basis for examination. Thus, the examination as to an exclusion from patentability, by reference to Article 52(2), has to be based on the subject-matter of



the claim as a whole, rather than on the contribution which the subject-matter claimed adds to the known art even if this subject-matter is considered as a whole, as further set out in the above indicated part of the Guidelines, to determine whether the subject-matter as a whole relates to an invention within the meaning of Article 52(1) EPC. Pursuant to Article 52(3) EPC this can only be denied if the claimed subject-matter relates to non-technical subject-matter, for example to a method for performing mental acts or other items listed in Article 52(2) EPC, "as such" which means that it is limited to this subject-matter, e.g a mental act, without involving technical aspects, for example required technical considerations, implied technical effects or a technical problem solved.

- 3.3 In the present case the method of claim 1, seen as a whole, basically determines the compaction degree of for example asphalt by measuring for each pass of a compacting machine over a particular area or segment values defining a partial compaction effect and summing the partial compaction effects of each pass to indicate the total compaction effect of that area or segment. This is not a pure mental act or computer program because it is not limited to steps, for example the summation, which could be made mentally or with a computer program. In fact, the total compaction effect is a technical effect, and the measurement of values defining a partial compaction effect requires technical considerations for selecting appropriate parameters to be measured and technical measures for actually measuring the values of these parameters. Further, the step of summing the partial compaction effects for each pass is likewise based on technical considerations defining a relationship between the partial compaction

effects and the total compaction effect. The mere possibility of performing a single step of this method, the addition of the values defining a partial compaction effect, mentally or by a computer program cannot, therefore, detract from the evident technical character of the subject-matter of claim 1. Otherwise any technical control method using a computer program would be non-technical which is clearly unreasonable.

3.4 The independent claim 2 comprises the same - technical - features as claim 1 and further includes the steps of controlling the compacting machine on the basis of the total compaction effect or index number. This control is not a mere mental act but involves a physical action on the compacting machine to change its operation, which is another clear technical feature.

3.5 Claim 13 is directed to a device for carrying out the method of claim 1. Since the subject-matter excluded from patentability in Article 52(2)c) EPC relates to activities or tasks carried out by human beings or computer programs, rather than to devices, a device claim, considered as a whole, cannot in principle fall under this provision. Further, claim 13 comprises measuring means and determining means defined by their function to measure values defining a compaction effect and to determine the partial and total compaction effects. These functional definitions imply a certain interrelation and structure of the measuring and determining means, thereby representing technical features of the claim.

3.6 The Board, therefore, concludes that the subject-matter of independent claims 1, 2 and 13 relates to an invention within the meaning of Article 52(1) EPC and

is not excluded from patentability under Article 52(2)c) EPC.

4. *Further examination as to novelty and inventive step (Articles 52, 54 and 56 EPC)*

4.1 The Board exercises its discretion given by Article 111(1) EPC to further examine the application because a preliminary, negative opinion on novelty and inventive step was already expressed in the communication dated 28 May 1997 issued by the Examining Division.

4.2 Document US-A-4 103 554 considered as novelty destroying in that communication discloses a compacting machine comprising, in the embodiment of Figure 1, a transducer G11 or, in the embodiment of Figure 4, a number of transducers G11, G12, G21 and G22 for sensing the vibratory motions of parts P1 or P1 and P2, respectively, of the compacting machine contacting the soil to be compacted. Based on the discovery that a relationship exists between the achieved degree of compaction of the soil and the amplitude of the vibratory motion of the compacting device, as described in column 2, lines 14 to 20, the total compaction degree up to a certain passage of the compacting machine is determined from the amplitude signal delivered by the transducers only at that passage (see in particular column 8, lines 31 to 51).

4.3 The subject-matter of independent claims 1, 2 and 13 is distinguished from this prior art in that the total compaction degree is determined on the basis of the sum of the respective values of variables defining the compaction effect as measured at all previous passages

of the compacting machine. This method appears to be more complex than the prior art because all previous measurements, rather than only the last measurement, must be taken into account. However, it has the advantage that the variables selected for defining the compaction effect must have an effect on the compaction but do not need to be responsive to this compaction. Thus, easily measurable variables such as the temperature of the material to be compacted, the movement speed, vibratory frequency etc. of the compacting machine can be selected as variables, whereas the known method depends on the amplitude at a certain frequency which requires complex processing in order to filter out the desired variable.

4.4 The further prior art cited in the Search Report discloses methods of determining the degree of compaction either by processing a signal obtained at the last passage of the compacting machine (US-A-4 467 652) or by considering the rate of change of a variable between two successive passages (US-A-4 348 901, EP-A-0 027 512 and DE-A-3 336 364). Thus, this prior art cannot provide a pointer towards the claimed solution of determining the total compaction effect as the sum of the partial compaction effects at each passage of the compacting machine.

4.5 Hence, it can be concluded that the subject-matter of the independent claims 1, 2 and 13 is neither known from, nor rendered obvious by, the available prior art. The industrial applicability e.g. in the field of road construction is evident. The independent claims, together with dependent claims 3 to 12 and 14 to 19 relating to preferred embodiments, therefore meet the requirements of Article 52 EPC.

**Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

**Claims:** 1 to 19 submitted with letter of 17 May 2002

**Description:** pages 1 and 3 to 17 of the application as filed  
pages 2, 2a, 2b submitted with letter of 25 September 1997

**Drawing:** sheets 1/5 to 5/5 as originally filed.

The Registrar:

The Chairman:

A. Counillon

C. T. Wilson