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**Datasheet for the decision
of 19 February 2010**

Case Number: T 0994/08 - 3.2.01

Application Number: 99910808.7

Publication Number: 0987151

IPC: B60R 21/16

Language of the proceedings: EN

Title of invention:

Control apparatus of safety device for crew

Patentee:

Toyota Jidosha Kabushiki Kaisha

Opponent:

Conti Temic microelectronic GmbH
Robert Bosch GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Relevant legal provisions (EPC 1973):

EPC Art. 56, 84

Keyword:

"Inventive step - (no)"
"Claims - clarity - (no)"

Decisions cited:

G 0009/91, T 0313/98

Catchword:

-



Case Number: T 0994/08 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 19 February 2010

Appellant I: Toyota Jidosha Kabushiki Kaisha
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Appellant II: Robert Bosch GmbH
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Representative: -

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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
31 March 2008 concerning maintenance of
European patent No. 0987151 in amended form.

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
S. Hoffmann

Summary of Facts and Submissions

- I. The appeals by the patent proprietor and opponent II are directed against the interlocutory decision posted 31 March 2008 according to which, account being taken of the amendments made by the patent proprietor during the opposition proceedings according to its second auxiliary request, European patent No. 0 987 151 and the invention to which it relates were found to meet the requirements of the EPC.
- II. The following evidence played a role during the appeal proceedings:
- E1: DE-T-195 81 772;
- D2: EP-A-0 458 796;
- D4: DE-A-43 24 753.
- III. The opposition division had found *inter alia* that the subject-matter of the claims 1 as granted and according to the patent proprietor's first auxiliary request did not involve an inventive step in the light of the disclosures of E1 and D2.
- IV. At oral proceedings held on 19 February 2010 appellant I (the patent proprietor) requested that the decision under appeal be set aside and the oppositions be rejected (main request) or in the alternative that the patent be maintained on the basis of claims according to auxiliary requests 1 to 6. Appellant II (opponent II) and the party as of right (opponent I)

requested that the decision under appeal be set aside and the patent revoked.

V. Claim 1 as granted (main request), the only independent claim, reads:

"An activation control apparatus of an occupant safety system comprising:

a first sensor (32) disposed at a predetermined position in a vehicle, for detecting impact on the vehicle, activation control means (40) of the occupant safety system for activating the occupant safety system when an operation value obtained based on a detection value detected by said first sensor exceeds a predetermined threshold, and

a second sensor means (30A, 30B) disposed more to the front than said first sensor in said vehicle, for detecting a level of impact on said vehicle to detect values of at least two different magnitudes according to the level of the impact detected,

characterised by further comprising:

threshold changing means (42) for changing said predetermined threshold according to a detection value of said second sensor means;

wherein said threshold changing means (42) comprises threshold change amount increasing means for increasing a change amount of said predetermined threshold with increase in a value based on the detection value of said second sensor means."

VI. Claim 1 according to the first auxiliary request, filed with a letter of 27 December 2007 and amended as requested in a letter of 13 October 2008, differs from

claim 1 as granted by the addition of the wording indicated in italics:

"characterised by further comprising:
threshold changing means (42) for changing said predetermined threshold to a *lower threshold* according to a detection value of said second sensor means;"

VII. Claim 1 according to the second auxiliary request, filed during oral proceedings on 25 February 2008, differs from claim 1 as granted by the addition of the following wording at the end of the claim:

"wherein the value based on the detection values of said second sensor means (30A, 30B) is a value resulting from integration of the detection value of said second sensor means over a predetermined duration."

VIII. Claim 1 according to the third auxiliary request, filed with a letter of 15 December 2008, differs from claim 1 as granted by the addition of the following wording at the end of the claim:

"wherein said threshold change amount increasing means is arranged to subtract a value based on an operation value resulting from integration of the detection value of said second sensor means (30A, 30B) over a predetermined duration, from said predetermined threshold."

IX. Claim 1 according to the fourth auxiliary request, filed with the letter of 15 December 2008, differs from

claim 1 as granted by the addition of the following wording at the end of the claim:

"and threshold change amount decreasing means for decreasing the change amount of said predetermined threshold corresponding to an initial increase state of the operation value based on the detection value of said first sensor (32)."

Claim 3 according to the fourth auxiliary request differs from claim 1 as granted by the addition of the following wording at the end of the claim:

"and wherein said threshold changing means (42) is arranged not to change said predetermined threshold corresponding to an initial increase state of the operation value based on the detection value of said first sensor (32) only when the operation value based on the detection value of said second sensor means (30A, 30B) exceeds a predetermined value."

- X. Claim 1 according to the fifth auxiliary request, filed with the letter of 15 December 2008, differs from claim 1 as granted by the addition of the following wording indicated in italics:

"threshold changing means (42) for changing said predetermined threshold in a determination map and for changing said predetermined threshold according to a detection value of said second sensor means, wherein said threshold changing means (42) comprises threshold change amount increasing means for increasing a change amount of said predetermined threshold in said

determination map with increase in a value based on the detection value of said second sensor means.

- XI. Claims 1 and 3 according to the sixth auxiliary request, filed with the letter of 15 December 2008, differ from the respective claims according to the fourth auxiliary request by the addition of the following wording:

"wherein the value based on the detection value of said second sensor means (30A, 30B) is a value resulting from integration of the detection value of said second sensor means over a predetermined duration."

- XII. The submissions of appellant I in respect of the main request and first auxiliary request may be summarised as follows:

As regards inventive step of the main request the opposition division was correct in assessing the disclosure of E1 as not including the feature of threshold changing means comprising threshold change amount increasing means for increasing a change amount of the predetermined threshold with increase in a value based on the detection value of the second sensor means. This distinguishing feature solves the problem of how to optimise the timing of activating the occupant safety system. However, contrary to the finding of the opposition division, the distinguishing feature cannot be derived from D2. The additional sensors according to D2 produce an on/off signal and are not capable of detecting at least two different levels of magnitude of impact of a vehicle. As a result, there is no teaching to increase the amount by which the threshold is lowered. Moreover, D2 teaches away from using front

sensors. D4 only relates to side impacts in which there is no crumple zone and therefore is not relevant to frontal impacts. In particular, the problem of ensuring that an airbag is activated sufficiently early in the case of an oblique impact does not arise. It is stated that a side impact requires a different type of sensor which, furthermore, is not positioned more to the front than the central sensor.

As regards inventive step of claim 1 according to the first auxiliary request, the basic idea of E1 is to activate an additional airbag in response to a more severe impact. There is no suggestion to advance the activation of the airbag and consequently no motivation to lower the threshold.

XIII. The responses of appellant II and the party as of right in respect of the main request and first auxiliary requests were essentially as set out below:

The subject-matter of claim 1 according to the main request is obvious in the light of the teaching of E1 alone. It is derivable from page 10 in the second and third paragraphs, which disclose that the degree of the impact is derivable from the signal from the front sensor, that the front sensor has a continuous output. E1 further teaches that the threshold is variable in dependence on the output of the front sensor and the skilled person when putting this combined teaching of E1 into effect would vary the amount by which the threshold were changed. D2 is confirmation that this would be carried out by the skilled person. The teaching of D4 is also relevant in this respect since

the same basic principles are applicable in both frontal and side impacts.

The additional feature of claim 1 according to the first auxiliary request, namely that the threshold is lowered, is already known from D2 and anyway follows logically from the fact that the aim of employing the front sensor to indicate the severity of the impact is to achieve an increase in sensitivity when an impact occurs.

XIV. Appellant II and the party as of right submitted in respect of the second to sixth auxiliary requests essentially that:

The additional feature according to the second auxiliary request of integrating the sensor signal is already known from both E1 and D2.

The additional feature according to the third auxiliary request is already known from D2 and anyway to the skilled person would be the most obvious way of changing the threshold.

The wording added to claims 1 according to the fourth and sixth auxiliary requests renders the claims unclear because it cannot be understood when the jump to the initial increase state is made.

The feature of the determination map in claim 1 according to the fifth auxiliary request is unclear in as far as it could mean either a general storage or the particular form as originally disclosed in paragraph [0033].

XV. Appellant I responded in respect of the second to sixth auxiliary requests essentially as follows:

As correctly recognised by the opposition division none of the available documents suggests integrating the signal from a front sensor as the basis for increasing the amount by which the threshold is changed. E1 determines the difference between integrated values of the signal from a front sensor and from a central sensor but for a different purpose to present claim 1. Integration of a signal in accordance with D2 is only in respect of the central sensor. The integration helps to eliminate the effect of external disturbances on the signal so that the result is more reliable.

As to inventive step of the subject-matter of claim 1 according to the third auxiliary request the feature of subtraction of the integrated signal from the front sensor is not obvious. This feature relates to how the variable change in the threshold is determined. By comparison, D2 only discloses a linear reduction of the threshold.

The two independent claims according to auxiliary requests 4 and 6 relate to alternative embodiments. Claim 1 derives from claims 1 and 9 as granted and for that reason alone is clear. The subject-matter of claim 1 relates to reduction of the amount by which the threshold is changed in order to prevent activation of a restraint system in response to signals resulting from rough roads.

The additional feature of the "determination map" in claim 1 according to the fifth auxiliary request was originally disclosed in paragraph [0033].

Reasons for the Decision

1. Occupant restraint systems in automobiles commonly require activation, such as inflation of an airbag or pre-tensioning of a safety belt. In order for the restraint to be effective the timing of the activation following an impact is critical. Apparatus for controlling the activation commonly comprises a sensor (designated "first" in the present file) mounted close to the centre of the vehicle for measuring deceleration during an impact and a control unit which receives a signal from the sensor. The control unit typically processes the signal and compares it with a pre-determined threshold. Based on the result of the comparison it decides whether to supply a signal to activate the restraint system. In the course of a full-frontal impact the central sensor measures high decelerations which quickly lead to a signal exceeding the threshold, ensuring sufficiently early activation. However, this may not be so in the case of other types of frontal impact, such as oblique. Whilst a lower threshold may permit sufficiently early activation in response to an oblique impact it increases the risk of undesired activation in response to non-impact conditions such as travelling over rough surfaces. In order to distinguish between impact and non-impact conditions additional sensors (designated "second" in this file) are positioned closer to the front of the vehicle in order to determine when an impact occurs and

their signals are used by the control unit to then adjust the threshold. The patent relates to the manner in which the threshold is adjusted.

Main request

2. During the written phase of the appeal procedure appellant II pursued its objection raised in opposition proceedings that the subject-matter of claim 1 as granted had been amended in such a way as to extend beyond the content of the application as filed (Article 100(c) EPC 1973). However, that objection was withdrawn during the oral proceedings on 19 February 2010 so that it remains to consider only inventive step of the subject-matter of this request.

3. The board and all parties are in agreement that the closest state of the art is disclosed by E1. There is further agreement that E1 discloses at least all features of present claim 1 except:
 - wherein said threshold changing means comprises threshold change amount increasing means for increasing a change amount of said predetermined threshold with increase in a value based on the detection value of said second sensor means.

This feature has the effect of better tailoring the response of the system to the severity of the impact. The corresponding problem as defined by appellant I may be seen as optimising the timing of activation of the occupant safety system. E1 discloses that the threshold be changed in dependence on a signal received from the second sensor. The party as of right argues that since

in accordance with E1 the signal from the second sensor may be a continuous one it is implicit that the degree of change of the threshold is similarly variable. However, that is not directly and unambiguously derivable from E1 since the variable signal from the second sensor may be associated with a series of equally sized changes in the value of the threshold.

4. D4 relates to an activation device for a side-impact protection system. It begins by explaining that whilst airbags were well known for use in frontal impacts the minimal crumple zone available in side impacts places high demands on the sensor and control unit to achieve satisfactory protection within the time available. It acknowledges earlier prior art for use in frontal impacts in which a first, central sensor is employed together with a second, more forwardly located sensor whose signal is used to lower the activation threshold. It states that the system could be used for side impact protection but that adaption to the more critical timing would result in a level of the threshold which is too low to avoid undesired activation. In accordance with D4 the signal from the side sensor is used to trigger integration of the signal from the central sensor, which integrated signal is then compared with a threshold value to trigger activation of the airbag. In one embodiment the threshold is reduced by an amount in dependence on the speed of deformation derived from the side sensor, see particularly column 5, lines 5 to 8 and claim 4.

- 4.1 As argued by appellant II the skilled person would be aware that the fundamental considerations pertaining to frontal and side impacts are essentially identical.

Indeed, this is derivable from the acknowledgement in D4 of earlier state of the art relating to frontal impact. As regards timing of activation the conditions are more critical in the side impact because of a reduced crumple zone. The skilled person therefore would consider the teaching of D4 when seeking to improve the timing of activation of the system according to E1. He would particularly be drawn to the statement in D4 column 5, lines 5 to 8 that a higher speed of deformation leads to a greater reduction in the threshold. In applying that teaching to the system according to E1 he would arrive at the subject-matter of present claim 1 without inventive activity.

- 4.2 Appellant I argues that the problem of ensuring that an airbag is activated sufficiently early in the case of an oblique impact does not arise in D4. However, that problem has already been solved in E1 by the use of the signal from the second sensor as a basis for adjusting the threshold to reliably avoid undesired activation whilst nevertheless ensuring that sufficiently early activation during an impact. That same problem, albeit in the context of side impacts, has already been solved also in D4. However, the teaching of D4 is more complete as regards the manner in which the threshold is changed and it is that information which the skilled person would learn from D4 and apply to the system disclosed in E1. Whilst E1 and D4 do provide different types of second sensor, in both cases the signals generated by them are employed to create a speed signal.
5. On the basis of the foregoing the board finds that the subject-matter of present claim 1 does not involve an inventive step (Article 100(a) EPC 1973).

First auxiliary request

6. The subject-matter of claim 1 according to this request differs only in that the threshold is "lowered". E1 mentions that the threshold is changed but is silent as to the direction of change. However, it is implicit for the skilled person that the change would be to lower the threshold. As set out under point 1 above, the idea behind employing sensors at the front of the vehicle is to increase the sensitivity of the system in response to the certainty that an impact has occurred. Such an increase in sensitivity is achievable by changing the threshold only downwards. Moreover, not only is this feature known from D4, see column 4, lines 44 to 51, but also in the earlier state of the art relating to frontal impacts acknowledged in D4, see column 1, lines 41 to 44. The board therefore concludes that the amendment to claim 1 according to this request fails to establish an inventive step.

Second auxiliary request

7. Claim 1 according to this request contains in comparison with claim 1 as granted the additional feature that the value derived from the signal of the second sensor means and on which the change of the threshold is based is an integration of the signal over a predetermined time. In accordance with E1 the change in the threshold is dependent on a signal from the front sensor but the manner in which the acceleration signal provided by the sensor is processed is not disclosed. D4, on the other hand, teaches that the value derived from the second sensor and upon which the

change in the threshold is based is the speed of deformation, see e.g. column 3, line 62 to column 4, line 4. The skilled person would know from his general knowledge that a corresponding speed value representative of the severity of the impact would be obtainable from an acceleration signal by integrating it over a predetermined time. Application to E1 of the teaching of D4 in the light of that general knowledge would result in integration of the signal provided by the second sensor means. It follows that the subject-matter of claim 1 also according to this request does not involve an inventive step.

Third auxiliary request

8. Before considering this request in detail the board considers it useful to briefly recap that it has found in respect of the first and second auxiliary requests that it is obvious to arrange the threshold changing means to integrate the acceleration signal obtained from the second sensor means to form a value as a basis for lowering the threshold. In comparison with those higher order requests the additional wording in claim 1 according to the present request essentially further specifies that the lowering of the threshold is achieved by "subtraction" of the integrated value from the threshold. Appellant I offered no argumentation in support of inventive step of this feature and in the board's view this method of lowering the threshold would readily occur to the skilled person. Indeed, in D2, which also relates to a system for activating an occupant restraint system, the lowering of the threshold is by a simple act of subtraction, see column 5, lines 20 to 25. The board therefore finds

that also the subject-matter of claim 1 according to this request does not involve an inventive step.

Fourth auxiliary request

9. Claim 1 according to this request contains the additional feature of "threshold change amount decreasing means for decreasing the change amount of said predetermined threshold corresponding to an initial increase state of the operation value based on the detection value of said first sensor". It is unclear what is meant by the wording "initial increase state". In particular, whilst the term "increase" implies a comparison it is unclear what the basis for the comparison might be when the term "initial" implies that no earlier state can serve as a basis for the comparison. It is common in the event of difficulties in understanding the wording of a claim during opposition appeal proceedings to interpret the claim in the light of the description. Corresponding wording is found in paragraphs [0018], [0019] and [0064] in the latter two of which there is reference to avoiding over-sensitivity to accelerations sensed whilst travelling over rough roads. It would therefore appear that the aim is to avoid over-sensitising the system under certain conditions, indeed appellant I confirmed as much. However, the definition of the subject-matter of the claim, namely an apparatus to achieve that aim, remains obscure. Appellant I argues that the wording added to claim 1 according to this request is clear because it was in claim 9 as granted. The Enlarged Board of Appeal set out in decision G 9/91 (OJ EPO 1993, 408), see point 19, that "in the case of amendments of the claims or other parts of a patent during the course

of opposition or appeal proceedings, such amendments are to be fully examined as to their compatibility with the requirements of the EPC". In the present case claim 1 has been rendered unclear as a result of the amendment. Moreover, without being able to understand what is the subject-matter of the claim the board finds itself unable to judge the presence of any inventive step. Under these circumstances the board has no option but to find the present request unallowable due to lack of clarity of claim 1.

10. Further objection arises from the presentation of an additional independent claim. In the claims as granted a single independent claim 1 was followed by *inter alia* dependent claims 9 and 10. In accordance with the present request, on the other hand, two independent claims 1 and 3 contain the features of granted claims 1, 9 and 1, 10 respectively. Since claim 10 as granted was dependent on *inter alia* claim 9 its subject-matter could have remained in a claim dependent on presently amended claim 1. The filing of independent claim 3 therefore is not necessitated by a ground for opposition and appellant I failed to provide any reasoning to the contrary. In accordance with established case law of the Boards the filing of an additional independent claim which is not necessitated by a ground for opposition is not admissible, see e.g. T 313/98, point 1.1 of the Reasons (not published in OJ EPO).

Fifth auxiliary request

11. Claim 1 has been amended according to this request essentially to specify that the predetermined threshold

is stored "in a determination map". In the application as originally filed the determination map was first described in paragraph [0033], to which the appellant refers as the basis in the original disclosure. It was illustrated for various disclosed embodiments in the respective figures 4, 6A, 8A and 12 as a plot of the threshold in respect of V_2 and V_1 where V_2 and V_1 signify integration of the deceleration measured by the central sensor over periods of 10ms and 150ms respectively. The skilled person presented with the application as originally filed was therefore taught that the determination map is a storage of values of the threshold for a range of values of the acceleration measured over two particular and very different time periods. The determination map as in present claim 1, on the other hand, is wholly unspecified in respect of the time periods over which the integration is performed. As a result, the patent as amended according to this request teaches a more general case than the original, for which there was no basis in the application as originally filed and thereby extends the subject-matter (Article 123(2) EPC).

Sixth auxiliary request

12. Claim 1 in this request includes the same wording as was added to claim 1 according to the fourth auxiliary request and accordingly also is unclear in defining the subject-matter to be protected. Moreover, also as in accordance with the fourth auxiliary request, an independent claim 3 has been added. This request therefore results in the same objections as does the fourth auxiliary request.

On the basis of the forgoing the board finds that none of the requests can be accepted.

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:

A. Vottner

S. Crane