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Case Number: T 2333/08 - 3.2.05

Application Number: 97938173.8

Publication Number: 0921923

IPC: B29C 44/06

Language of the proceedings: EN

Title of invention:
Protection of pipeline joint connections

Patentee:
Subsea Services International, Inc.

Opponent:
EUPEC PIPECOATINGS FRANCE SA

Headword:
-

Relevant legal provisions:
EPC Art. 56, 114(1)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inventive step - no"
"Late-filed request - not admitted"

Decisions cited:
-

Catchword:
-

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Case Number: T 2333/08 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 24 May 2011

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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 21 October 2008 revoking European patent No. 0921923 pursuant to Article 101(3)(b) EPC.

Composition of the Board:

Chairman: W. Zellhuber
Members: H. Schram
E. Lachacinski
S. Bridge
M. J. Vogel

Summary of Facts and Submissions

I. The appeal is against the decision of the Opposition Division posted on 21 October 2008 revoking European patent No. 0 921 923 on the ground that the subject-matter of claim 1 of the main request (claim 1 as granted) and of auxiliary request 1 of the appellant (patent proprietor) did not involve an inventive step, Article 56 EPC, and that the subject-matter of claim 1 of auxiliary request 2 did not disclose the invention in a manner sufficiently clear und complete for it to be carried out by a person skilled in the art, Article 83 EPC.

II. Oral proceedings were held before the Board of Appeal on 24 May 2011.

III. The appellant requested that the decision under appeal be set aside and that the patent in suit be maintained on the basis of the following documents:

- main request: claims 1 to 7 filed as the main request on 27 February 2009; or
- first auxiliary request: claims 1 to 7 filed as the sixth auxiliary request on 21 April 2011; or
- second auxiliary request: claims 1 to 7 filed as the second auxiliary request during oral proceedings.

The respondent (opponent) requested that the appeal be dismissed.

IV. Claim 1 of the main request reads as follows:

"1. A method for protecting exposed joint connection portions of a weight coated pipeline (10) being laid under water from a vessel comprising the steps of:

forming a pliable sheet of a thermoplastic synthetic resin cover material (30) into the form of a cylinder around the exposed joint connection (18, 18A, 20) such that the cover material overlaps the weight coating (14, 14A) of the pipeline on either side of the exposed joint connection;

sealing the installed cover material together to form a void (44) between the pipe and the cover material, said cover material being provided with an opening (38) extending therethrough between the void and the exterior;

injecting fluid joint filler system components through the opening into the void and allowing the joint filler system to solidify and form a high density open celled foam material (52) filling the void; and

allowing the foam material to absorb water,

said cover material (30) and foam material providing a protective system for the joint connection of the underwater pipeline."

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the wording "injecting ... filling the void" has been replaced by the wording "*injecting through the opening in the void as fluid joint filler system components polyurethane chemicals and allowing the joint filler system to react and solidify inside the cover material and form a high density open celled polyurethane foam material (52)*

filling the void, no additional filler materials being used in conjunction with the polyurethane foam".

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary in that the expression "without leaving significant void areas" has been inserted after the expression "filling the void".

V. The documents referred to in the appeal proceedings included the following:

D15 US-A 4,909,669

D18 US-A 5,328,648

D24 *A Unique Joint Covering*, Henderson, R. B., reprinted from Pipeline Digest, April 1, 1985 (2 pages).

D32 *Cellular Plastics Materials for Pipeline Applications*, Pool, P. L., 6th International Conference on the Internal and External Protection of Pipes, BHRA 1985, pages 215 to 226.

D33 *Applications of Polyurethanes for Problem Solving in the Pipeline Industry*, Dressel, D., 8th International Conference on the Internal and External Protection of Pipes, BHRA 1990, pages 259 to 267.

VI. The arguments of the appellant, in writing and during the oral proceedings, can be summarized as follows:

Main request - objection of lack of inventive step, Article 56 EPC

Document D15, which was cited in paragraph [0010] of the patent in suit (see also paragraph [0011]), disclosed a pipeline joint protector including a thermoplastic impact member (sheet or sleeve 30) having high impact resistance, which was wrapped around a pipe joint formed by welding abutting ends of pipe together. The main thrust of this document was that reinforcing members such as plastic bars 36, 37 should be affixed to the interior of the sleeve with a view to increasing its rigidity and impact resistance, see column 1, lines 47 to 60, and Figures 4 and 5. Alternatively, a preformed high impact resistant C-shaped member 16 was inserted into the lower half of the annular space between the pipe and the plastic sheet, see column 1, line 60 to column 2, line 17, and Figure 3A. Whereas the sleeve 30 provided a protective barrier against impact by trawler boards, the high impact resistant member 16 acted to cushion the pipe as it passed over the rollers on the lay barge (see column 1, lines 33 to 37, and column 3, lines 14 to 23).

There was only one reference in document D15 to injection of a foam material into the lower half of the annular space between the pipe and the plastic sheet as an alternative to inserting the C-shaped member 16 into said space, see column 4, lines 20 to 24. However, document D15 was silent about how the foam material was injected into said annular space. It did not disclose forming an opening in the sheet. In order to inject the foam material into the lower half of the annular space the person skilled in the art would presumably position

the sheet around the pipe, leaving a gap between the end portions of the sheet (see eg document D18, column 3, lines 57 to 64), inject the foam material and finally wrap the sheet completely around the pipe and weld the overlapping portions together, so that forming a cylindrical sealed sleeve was the last step. In contrast, in the method according to the patent in suit the cover material (sheet) was first formed into the form of a cylinder, then sealed, the cover material being provided with an opening, whereupon fluid joint filler system components were injected through the opening into the void.

The following features of claim 1 of the main request (in regular font) were not disclosed in document D15: **no** opening in the sheet, sheet **not** sealed before filling, **no** *open-celled* foam material, fluid joint filler system components **not** injected through the opening, void **not** completely filled, and **no** foam material which may absorb water.

These distinguishing features acted together in concert and provided a synergistic effect: it allowed a pipeline to be laid rapidly and safely under a variety of conditions, eg heavy seas. Moreover, the claimed method allowed a controlled foam density to be achieved.

Starting from document D15 it was not obvious to arrive at the claimed invention. Document D15 expressly taught that **only** the lower half of the annular space had to be cushioned against the lay barge rollers. There was no need to fill the whole annular space, since the upper half of the annular space was already protected against

impact from trawler boards by the sleeve 30 itself. It was not necessary to provide an opening in the sheet or to seal the sheet before filling, since filling the lower half of the annular space could be done through a gap between the end portions of the sheet. It followed that the subject-matter of claim 1 of the main request was not obvious to the person skilled in the art.

First auxiliary request - objection of lack of inventive step, Article 56 EPC

Claim 1 of the first auxiliary request specified "*no additional filler materials being used in conjunction with the polyurethane foam*". This feature was neither known from nor suggested by the cited prior art. All of the cited prior art documents disclosed polyurethane foams for joint fill applications which were filled with a particulate aggregate (inert mineral filler), see eg document D24 (see the paragraph bridging the left and middle columns on the title page), document D32 (see page 216, first paragraph, and page 218 ("Coumite™ Material Description"), and document D33 (page 259, last paragraph). The inert material provided negative buoyancy to the pipeline. Documents D24, D32 and D33 related to using polyurethane foams and solids for applications with removable molds (not with flexible sheets). The reference in document D33 on page 263, fourth paragraph, "to form a joint (with or without fillers added)" concerned fast cure solid polyurethane polymers, and not foams. It followed that the subject-matter of claim 1 of the first auxiliary request involved an inventive step.

Second auxiliary request

The term "filling" in the expression "a high density open celled foam material (52) filling the void" implied two (related) requirements. The first was that the void became fully occupied. The second was that the void became fully occupied by only open celled foam material, rather than by an open celled foam filled with a particulate aggregate. The amendment "without leaving significant void areas" made the second requirement explicit, it did not introduce a new issue. Furthermore, the amendment provided an additional reason why no additional filler materials were needed for use in conjunction with the polyurethane foam (as claimed in claim 1 of the first auxiliary request): all the void space was already occupied by only open celled polyurethane foam, see paragraph [0031] of the patent in suit. The second auxiliary request should therefore be admitted into the appeal proceedings.

VII. The respondent's arguments, in writing and during the oral proceedings, can be summarized as follows:

Main request - objection of lack of inventive step, Article 56 EPC

Document D15 represented the closest prior art. The claimed invention differed from the embodiment whereby high density foam material was injected into the annular space formed by the plastic sheet around the pipe and allowed to setup or form in place (see column 4, lines 15 to 37) in that (i) the sheet was provided with an opening; (ii) the annular space was completely filled; and (iii) the foam was an open foam

which was allowed to absorb water. The distinguishing features solved three distinct problems, namely (I) ease of injecting the foaming material; (II) improving the reinforcing effect and/or impact resistance of the final joint connection; (III) counteracting the negative buoyancy resulting from closed foam and ensuring non-shielded cathodic protection of the joint connection.

Document D33 disclosed polyurethane field joint infill materials that were simple and safe to apply (see page 259, first and second paragraphs). These materials were injected into the space between the pipe and a clam shell or metal wrap mold (see page 263, first paragraph) and completely filled said space (see page 263, second paragraph). It followed that the mold had an opening (see also the word "lid" on page 265, section "Physical properties", line 5). Document D33 also disclosed open cell polyurethane foams (see page 264, section "Polyurethane foams"), which allowed for total absorption of water, thereby negating any floatation capability of the foam, see third paragraph of said section. The person skilled in the art seeking to solve the above problems (I) to (III) present in the method known from document D15 would find the respective solutions in document D33 and would thus arrive at the invention without exercising inventive skills.

First auxiliary request - objection of lack of inventive step, Article 56 EPC

The additional feature of claim 1 of the first auxiliary request only amounted to a disclaimer.

Polyurethane materials with or without fillers were already known from document D33, see page 263, fourth paragraph. It was a design choice and a matter of costs whether or not the person skilled in the art would decide to use additional fillers with the high density polyurethane foam (see document D33, page 259, last paragraph). Since neutral buoyancy was already achieved by using open cells saturated with water there was no need to add filler materials to the foam, unless negative buoyancy was required. Therefore the subject-matter of claim 1 of the first auxiliary request did not involve an inventive step.

Second auxiliary request

The amendment according to the second auxiliary request was late-filed and raised new issues under Articles 83 and 84 EPC in view of the expression "without ... significant void areas", in particular the meaning of the term "significant". Moreover, the expression "filling the void" in claim 1 of the main request and of the first auxiliary request was clear as it stood: the void was either filled, or not filled. If it was filled it was completely filled. Since the cited prior art already disclosed the feature "completely filling the joint" (see document D32, page 216, fifth paragraph, and document D33, page 263, line 6) the new feature did not contribute to inventive step. For all of the above reasons, the second auxiliary request should not be admitted into the appeal proceedings.

Reasons for the Decision

MAIN REQUEST

1. *Objection of lack of inventive step, Article 56 EPC*

Document D15 represents the closest prior art. This document discloses, with particular reference to the embodiment shown in Figures 2, 3 and 3A, a method for protecting exposed joint connection portions of a weight coated pipeline being laid under water from a vessel (see column 1, line 48, to column 2, line 17, column 3, lines 2 to 7, and column 4, lines 15 to 37), comprising the steps of (1) forming a sheet 30 of thermoplastic material into the form of a cylinder around the exposed joint connection 14 such that the cover material overlaps the weight coating C of the pipeline on either side of the exposed joint connection; (2)(a) inserting a preformed impact resistant member 16 during installation; *or, if desired,* (2)(b) injecting high density foam material into the annular space formed by the plastic sheet around the pipe P and allowing said foam to set-up or form in place; and (3) sealing the installed cover material together.

For the first alternative (2)(a), the steps (1) and (2)(a) take place simultaneously, followed by step (3).

Document D15 does not provide further details about the second alternative (2)(b), ie about the foaming embodiment, nor about the order of the steps of said embodiment. Document D15 discloses that high density foam material may be injected into the annular space

formed by the plastic sheet around the pipe P. The Board agrees with the appellant that the term "annular space" in step (2)(b) must be construed in the context of document D15 as "lower half of the annular space". Document D15 is silent on how the high density foam material is injected, and when that material is injected. In particular, document D15 is silent on providing an opening in the sheet for injecting the high density foam material trough it. The Board also concurs with the appellant that, for the foaming embodiment, document D15 does not disclose that the sheet is first formed into the form of a cylinder, then sealed and that, as a last step, the foam is injected.

The subject-matter of claim 1 of the main request differs from the disclosure of the foaming embodiment of document D15, mainly in that:

(i) the foam material [is] filling the void;

(ii) the cover material is provided with an opening extending therethrough between the void and the exterior; and

(iii) an open celled foam material is used, which is allowed to absorb water.

As regards feature (i), the expression "[foam material (52)] filling the void" in claim 1 of the main request must be construed in the light of the disclosure of the granted patent as a whole as meaning that the foam material completely fills the void, ie without leaving significant void areas (see column 6, lines 31 to 33).

The problem-solution approach is based on the premise that distinguishing features with respect to a piece of prior art correspond to technical effects, which in turn correspond to technical problems solved by these features. Using this is intended to avoid an *ex post facto analysis*, ie based on hindsight with knowledge of the invention.

In the present case, the person skilled in the art, who starts from the foaming embodiment, is first of all confronted with the question of how to inject the high density foam material into the lower portion of the annular space between the pipe and the plastic sheet. Following the approach of the appellant, the Board assumes that the person skilled in the art would wrap the sheet part-way around the joint such that a half-cylindrical mold is formed, inject the foam material from above into the space below the pipe and said half-cylindrical mold, allow the injected material to set-up or form in place, and finally wrap the end portions of the sheet overlapping one another around the joint and weld them together. In the judgment of the Board, the person skilled in the art seeking to improve further the impact resistance of the pipeline joint protector (cf. distinguishing feature (i)) would readily realize, by analogy with the embodiment shown in Figures 4 and 5 of document D15 (cf column 3, lines 33 to 54), that this may be achieved by filling the upper portion of the annular space between the pipe and the plastic sheet with foam as well. The person skilled in the art would further realize that when a foaming polymer is injected into a mold with a view to filling the mold, the mold must preferably be a closed mold in order to contain the expanding polymer. In the judgment of the

Board, this naturally leads the person skilled in the art to provide an opening in the sheet (cf. distinguishing feature (ii)) and to seal the sheet, which has been formed into the form of a cylinder, before injecting the expanding polymer.

The third distinguishing feature solves the problem of counteracting the floatation capacity of a foam. A document that discusses foam systems designed for joint fill applications on the lay barge is document D33. This document addresses the advantages of using open cell foams, see page 264, section "POLYURETHANE FOAMS (...)", third paragraph, as follows: "*Since these open cells allow for total absorption of water, any floatation capability of the foam is negated ...*" (see also document D24, first page, right hand column, lines 24 to 30, and document D32, page 218, section CHEMISTRY, where an open cell structure is said to allow water saturation in order to provide neutral or any negative buoyancy that may be required).

The subject-matter of claim 1 of the main request is therefore obvious to the person skilled in the art with respect to the foaming embodiment described in document D15 and the common technical knowledge in the art (see documents D33 and D24 referred to above) and hence does not involve an inventive step, Article 56 EPC.

FIRST AUXILIARY REQUEST

2. *Objection of lack of inventive step, Article 56 EPC*

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the text "injecting

... filling the void" has been replaced by the text "*injecting through the opening into the void as fluid joint filler system components polyurethane chemicals and allowing the joint filler system to react and solidify inside the cover material and form a high density open celled polyurethane foam material (52) filling the void, no additional filler materials being used in conjunction with the polyurethane foam*" (repositioned and additional features vis-à-vis claim 1 of the main request are indicated by double underlining and underlining, respectively).

The subject-matter of claim 1 of the first auxiliary request has been restricted (see the first half-sentence of the replacement text) to a preferred embodiment of the invention, namely a joint filler system which is a polyurethane system reacting inside the cover material, cf. page 3, lines 30 and 32, page 6, lines 3 to 5, claims 10, 11 and 18 of the application as filed (published version). The second half-sentence of the replacement text is a disclaimer, which is disclosed on page 7, lines 1 and 2.

In the judgment of the Board, the restriction to a polyurethane system cannot overcome the objection of lack of inventive step, since such a system is already disclosed in documents D24, D32 and D33.

The appellant argued that polyurethane foam material without filler was not known from, or suggested by, the prior art.

However, the patent specification is silent on the advantage(s) of using a pure polyurethane foam material

rather than a polyurethane foam material with a filler. The person skilled in the art knows that polyurethane polymers can be foamed, and can accept a variety of fillers at various levels, see eg document D33, page 259, last sentence. In the judgment of the Board, the person skilled in the art would thus, according to the circumstances, abstain from using fillers, for example when fillers are not needed to make the weight of the pipe joint heavier than the weight of displaced fluid, ie when it is not necessary to impart a negative buoyancy to the pipe joint.

SECOND AUXILIARY REQUEST

3. *Admissibility of the second auxiliary request*

The second auxiliary request was filed by the appellant during the oral proceedings after the Chairman had announced that claim 1 of the first auxiliary request did not involve an inventive step.

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary in that the expression "without leaving significant void areas" has been inserted after the expression "filling the void".

At the end of the communication attached to the summons to oral proceedings the Board stated the following:

"The attention of the parties is drawn to Articles 12(2) and 13 of the *Rules of Procedure of the Boards of Appeal* (RPBA), OJ EPO 2007, 536 ff. According to the latter, any amendment to a party's case after it

has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion.

The criteria for exercising this discretion include whether or not there are good reasons for the late filing and whether or not the amendments and submissions are relevant to a resolution of the issues to be discussed at the oral proceedings. In any case, they should be filed at least one month before the date set for oral proceedings in order to give the Board and the other party sufficient time to prepare for the oral proceedings. The Board may disregard facts or evidence which are not submitted in due time (cf. Article 114(2) EPC and Article 13(3) RPBA)."

The second auxiliary request was filed outside the time limit set by the Board for filing written submissions and/or requests. No good reasons were given by the appellant as to why the second auxiliary request could not have been filed earlier.

The appellant submitted that the amendment made it clear that the annular void was fully occupied by only open celled foam material, rather than by an open celled foam filled with a filler, which also followed from the passage in column 6, lines 31 to 35, of the patent in suit. However, in point 8.1 of the communication referred to above, the Board had already stated: "It appears that the expression '[foam material (52)] filling the void' in claim 1 of the main request must be construed in the light of the disclosure of the granted patent as a whole as meaning that the foam material completely fills the void, ie without leaving significant void areas (see column 6, lines 31 to 33)."

Although in said communication the Board left it open whether the foam material contained filler or not, this does not change the provisional interpretation that "foam material filling the void" means that the foam material with or without filler completely fills the void.

The additional feature is prima facie not relevant to a resolution of the issue of inventive step, since the feature (completely) "filling the void" is already known from document D33 (see page 263, line 6) and has been taken into account in assessing whether the subject-matter of claim 1 of the main request and of the first auxiliary request is obvious or not. Furthermore, in the judgment of the Board, if the amendment "filling the void without leaving significant void areas" were to be construed as meaning something different from "(completely) filling the void", this would shift the focus to facts not previously discussed in the appeal proceedings.

The second auxiliary request is therefore not admitted into the appeal proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Meyfarth W. Zellhuber