

部 会 報 告

ISO/TC 127/SC 1/WG 5 (ISO 5006 土工機械—運転員の視野)
2016 年 4 月ドイツ・アウグスブルグ市 国際作業グループ会議報告

標準部会 ISO/TC 127 土工機械委員会国際専門家 (Expert) 大本 康隆 (コベルコ建機)

国際標準化機構 ISO の専門委員会 TC 127 (土工機械) 傘下の国際作業グループ ISO/TC 127/SC 1/WG 5 (ISO 5006 土工機械—運転員の視野 改正) SC 2 とのジョイント作業グループ会議が 2016 年 4 月にドイツ国アウグスブルグ市で開催され、協会標準部会 ISO/TC 127 土工機械委員会から国際専門家 (Expert) として出席した大本康隆氏の報告を紹介する。

- 1 開催日：2016 年 4 月 6 日
- 2 開催地：ドイツ国アウグスブルグ市
STEIGENBERGER DREI MOHREN
- 3 出席者：21 名 及び WebEx 参加 6 名
米国 (ANSI) コンビナー兼プロジェクトリーダー (PL) 他 5 名 及び WebEx 参加 1 名
フランス (AFNOR) 3 名
英国 (BSI) 2 名
ドイツ (DIN) 4 名
イタリア (UNI) 1 名
スウェーデン (SIS) 1 名
日本 (JISC) 4 名 及び WebEx 参加 5 名

4 会議概要：

4.1 概要

会議で決定された大きな変更点は下記の 3 項目である。

1) 大型機のリスクアセスメント

これまでは試験が免除されていた大型機 (油圧ショベルでは 40 t 超) も試験が必須 (shall) となった。これまでは対象外であった 45 t 機種 (> 40 t) も試験の対象となる。⇒ 4.3 2) 参照
ただし、従来の対象機同様に実機試験をシミュレーションに代えて行うことが可能。

2) ミラーの配置位置

運転席の後方にミラーを置くことは認められる。ただし、Rectangular Boundary と Visibility test circle の確認のために用いてはならない。後方のミラーを廃止する必要はなくなる。ただし、RB と Visibility test circle の視認性評価には用いることはできない。⇒ 4.3 3) 参照

3) ミラーに写る像の規定

現行ミラーの曲率規定に戻すこと (日本提案) は認められない (Not Accepted)。Full Revision 時に再検討する。現行案の像の高さの測定を行うことが必須となる。⇒ 4.3 9) 参照

4.2 今後の日程

以下の内容が会議スクリーン上で示された。

plan the sequence of the next steps in the process to publication.

- ・ Information ADCO meets 26-27 April 2016 - CEN/TC 151 WG 17-19 May
- ・ Complete Comment form
- ・ Update N 72 document appropriately
- ・ Circulate to the Working Group - This is to verify comment form answers and changes in the draft to reflect comments.
- ・ Comment form and updated draft to WG by 1 May
- ・ Feedback on resolution of Editorial comments by 1 June
- ・ Resolution to be taken to proceed to publication to be launched by 7 Jun by one month Committee Internal Ballot.

- 1) EU 委員会の諮問機関である ADCO の会合を 4 月末に開催する。[EU 委員会の Warning 撤回を審議?]
- 2) CEN/TC 151 WG 会合を 5 月中旬に開催する。[EN474-1 改訂を担当]
- 3) 今回の WG の審議結果を反映した各国コメントへの回答の作成は 5 月初めまでに行う。
- 4) 回答に対する各国からの Feedback は 6 月初めまでに行う。
- 5) CIB 準備期間は～ 6 月初旬とする。
- 6) 規格発行に関する ISO 委員会の投票 (Committee Internal Ballot) の期間は 1 ヶ月 (～ 7 月初め) その後の日程の見通しは次の通り
- 7) ISO5006:2016 発行 2016 年 10 月
- 8) Official Journal への掲載は最短で 2017 年 6 月
- 9) EN/ISO 規格の効力発生が 2017 年 9 月

4.3 会議詳細

1) ドイツ意見

- ・270°に限定する項目については今後の改訂とすべき
- ・ブーム姿勢走行姿勢から可能な限り下げること
- ・visibility map を定義して設けるべき
⇒今後の検討項目とする

2) ドイツ：10.4 の大型機でも試験が義務付けられた (shall) (表—1)。

判定基準については今後説明を追加する。

Table 2 は最終的に含まれることになった。

また、9.2 項から大型機の場合でも、従来の対象機同様に実機試験をシミュレーションに代えて行うことが可能。

ただし Scope では“can”であり、矛盾の可能性あり。

〈DIS〉

1 Scope

This International Standard specifies a static test

method for determining and evaluating the operator's visibility on a rectangular 1 m boundary around the machine and on a 12 m visibility test circle.

This International Standard applies to the earth-moving machines as defined in ISO 6165 that have a specific seated operator's position. It provides visibility performance criteria for machines up to a maximum operating mass (see ISO 6016) depending on the type of machine family (see Table 1).

For machines not listed in Table 1, including larger machines, derivative earth-moving machines and other types of earth-moving machines, the visibility test procedures *can be* used along with the risk assessment process defined in the clause 10.4.

3) 日本意見

運転席の後方に地面を見るためのミラーを設置しても良い。ただし、RB 確認に使ってはならない (表—2)。

表—1

Item number	Subclass	Figure/Table	Type of comment	Proposed change	Comments
1					For machines that are not included in Table 1 due to their machine mass (i.e. larger mass), the manufacturer shall apply the tests and follow criteria as specified in this International Standard for the highest specified category of machine mass in the respective machine family and for those machines that do not meet the criteria, the manufacturer shall perform a risk assessment according to clause 10.4.3 to define the areas around the machine that need to be viewed by the operator and provide visibility aids if necessary to view these areas. Modify 10.4.2 For other types of earth-moving machines (including a combination of machine families from ISO 6165) or derivative earth-moving machines that are not included in Table 1, the manufacturer shall apply the tests and criteria as specified in this International Standard. For those machines, the criteria for the most similar machine type(s) (considering design and use) from Table 1 should be used. If it is not possible for those machines to meet the criteria, the manufacturer and shall perform a risk assessment according to

表—2

JP 154	7.2	1 st and 2 nd para.	ad.	A certain minimal swing radius excavator (MSRX) or minimal tail swing radius excavator (MTRX) is equipped with (a) surveillance mirror(s) behind the operator (on the rear end of the machine counterweight or stayed from the operator cab or canopy back side) so that	(Make further investigation as to effectiveness of a mirror behind the operator.)	Noted: A mirror cannot be used to address the risks due to visibility on the rear rectangular boundary or visibility circle. However, if the
--------	-----	---	-----	--	---	--

1. MB = Member body; NC = National Committee (under the ISO 15910 two-letter country code, e.g. TN for China); comments from the ISO/TC editing unit are identified by "2".

2. Type of comment: *gt* = general; *tec* = technical; *ad* = editorial

Page 12 of 51

Comments on ISO/DIS 5006:2016

Date: 2015-04-05

Document:

Project:

MB/NC	Line number	Class/Subclass	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Observations of the secretariat
					the operator, looking back, can get visibility to the ground around the machine rear end. This mirror layout is accepted in the market as the appropriate safety measure.		mirror is used to see the ground, it is not forbidden by this standard provided the criteria above is met.

- 4) スウェーデン：RB の範囲を明確化する。Figure 3 に説明を追加する（表—3）。
- 5) 英国：RB と 12m 円上の間の領域の評価方法について，Full Revision で行う（表—4）。
- 6) 日本：7.2 の表現：日本が図を用意して見直し文を提案する（表—5）。
- 7) 米国：リンケージの動きの表現を見直す（表—6）。
- 8) スウェーデン：RB の説明の分割を提案，却下された（表—7）。
- 9) 日本：現行のミラーでの曲率規定に戻す提案は却下され，Full Revision に回す。
確認の方法はシミュレーション，実機計測ともに可とするとの PL 見解。ただし，実際の試験方法について議論あり。計測方法は全面改定時に再検討する事となった（表—8）。
- 10) 英国：7.1 項の説明を変更する（表—9）。
- 11) 英国：10.2 項の説明を変更する（表—10）。

表—3

SE 001 014			Table 2	la	For some machine types the requirements for left and right side differ from the rear. Then it is not clear if the part of the rectangular boundary on the side (indicated in red) of the machine that is rear of the machine should fulfil the requirements for side or for rear. (For Graders we have the same question for the front part of RB.)	Clarify in the text that the red indicated part of the rectangular boundary rear of the machine, belong to the side requirements.	Additions of Front, Left side, right sides and rear rectangular boundary will be added Figure 3 to clarify
------------------	--	--	---------	----	--	---	--

表—4

UK 261		Scope		la	It should be made clear what the limitations/shortcomings are with this standard and that there may be remaining areas of restricted visibility.	Add the following Compliance with the performance requirements in this standard will not eliminate all of the risks associated with visibility. In particular, it does not specifically consider the gap between the RB and test circle. There may be areas of restricted visibility/maskings for some machine types in these areas.	Noted: There was discussion on whether this should be Scope or Intro, however, the depth of discussion needed on this topic requires it to be addressed during the full revision.
-----------	--	-------	--	----	--	---	---

表—5

JP 156		7.2	2 nd para, 2 nd	ad	The text is felt not easy to understand for design or test engineers not of English	Use easier English for those not of English mother tongue.	Accepted in principle, JP to provide a new figure to clarify the
-----------	--	-----	---------------------------------------	----	---	--	--

1. MB = Member body / NC = National Committee (under the ISO 3165 two-letter country code, e.g. CN for China, comments from the ISO/TCs voting and are identified by **)

2. Type of comment: ga = general la = technical ad = editorial

Page 53 of 53

Comments on ISO/DIS 5006:2016

Date 2016-04-05

Document:

Project:

MB/NC ¹	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
			sentence		mother tongue.		language. See other comments to improve the language.

表—6

US 220		8.3.3.3	2nd paragraph	Ed	The text from "Starting with the linkage" through the closing "...are masked" needs to be reworded and re-punctuated. As written, the text is nearly impossible to follow and understand.	Starting with the linkage in the travel position, the boom shall be manipulated through a range of motion that keeps the bucket above ground level. Either of the following may be used to determine if visibility aids for the side of the machine opposite from the operator (e.g. on the other side of a moving linkage from the side the operator is on) are masked: — a computer simulation using the eye spacing of 405 mm with the light bar perpendicular to the visibility aids being evaluated, — an operator in the seat with the eye point at the same height as the FPCP.	Accepted.
-----------	--	---------	---------------	----	---	---	-----------

表—7

SE 003 025		07.03			The text in chapter 7.3 are proposed to be divided into 2 chapters, one for RB and one for VTC to clarify definition. As I interpret this text the main part only apply to rectangular boundary. Clarifies that object size in mirror shall only apply to rectangular boundary. This is how I interpret it. Otherwise I think it can be difficult to measure the exact size in mirror. In reality I think this will be hard to follow and I expect the measurement uncertainty to be quite high and differs a lot. But it could serve as a estimation more or less. I would be easier if there was a described method for this. In a computer it's easy if it's possible, but if you do it in reality it's quite hard to get a reliable measured result.	7.3 Mirrors used to meet the visibility criteria 7.3.1 Rectangular boundary For indirect visibility with mirrors, the height of the reflection of a 1.5 m test object in the mirror shall be at least 7 mm for every 1.2 m that the mirror is positioned away from the operator's eye point (filament position <u>centre</u>-point). As an example, the reflection of a 1.5 m test object shall be at least 28 mm for a 4.8 m from the operator's filament position <u>centre</u>-point. This evaluation may be done either by physical testing, simulation, or calculation. This evaluation	Not accepted – Language in this comment field to expanding the visual aid performance applies equally at RB and VTC.
------------------	--	-------	--	--	---	--	--

表—8

JP 165		7.3	1 st para.	E4 / I4	Necessary measurement for the 1st sentence requirement, 7 mm for every 1.2 m is not easy to be achieved. We would like previous criteria be available as an alternative one	(After the 1st para., add as follows) Alternatively, performance criteria for mirrors maybe as follows: For indirect visibility to the visibility test circle, mirrors shall have a convex radius of curvature of 300 mm. For indirect visibility to the rectangular 1 m boundary around the machine, mirrors shall have at least a convex radius of curvature as follows: – 200 mm radius for up to 2,5 m from filament position <u>centre</u> point; – 300 mm radius for up to 3,5 m from filament position <u>centre</u> point; – 400 mm radius for up to 5 m from filament position <u>centre</u> point.*	Not accepted: - This was one of the key objections on issues with Visibility. Adding the spherical mirrors back at this time will be a problem, even if it is easier to measure. I believe this needs to be studied in the full revision after people have had experience meeting the new requirement intended to drive flatter mirrors.
-----------	--	-----	-----------------------	-------------------------------	--	---	---

表—9

UK 151		7.1	Visibility aids - 1st sentence	I4 Ed	In designing machines to address visibility, direct visibility is preferred. Insufficient emphasis to this requirement- a machine with ZERO direct visibility would conform to this statement. The requirements should be expressed as a hierarchy of design measures.	Change title and content: 7.1 Hierarchy of design measures In designing machinery direct visibility shall first be maximised. Visibility aids shall be added where there is insufficient direct visibility to meet the performance requirements in this International Standard.	Accepted – this is a clarification to provide better guidance.
-----------	--	-----	--------------------------------	------------------	---	---	---

表—10

UK 039		10.2	2nd para.	I4	Recommendations shall be made (if they are attached using a quick coupler). Over-emphasis has (potentially) diluted the requirement for machines without a quick coupler. Statement reads: 1) Attachments not attached using a quick coupler, therefore, MAY travel and 2) No recommendation is required unless attached using a QC	Delete statement in brackets. Recommendations apply to ALL machines, whether fitted with a QC or not.	Accepted in principle – strike language in parentheses and highlighted.
-----------	--	------	-----------	---------------	---	---	--