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Should we delete EN 13445 from the list of the harmonised standard?

Well, somebody in Europe seems to share this opinion. As you know, **Technical Committee 54 (Unfired Pressure Vessels) of CEN is carrying out the 5 years systematic review of all its standards.** Among them, the one which required more efforts is no doubt **EN 13445, the Unfired Pressure Vessel Standard**, published for the first time in 2002 and therefore candidate for the 5 years systematic review. In our newsletters I have spoken many times of this standard, trying to explain the reasons why **it has still to face the strong competition of many famous corresponding national Pressure Vessel standards**, although from the purely technical point of view it is certainly the most advanced Pressure Vessel standard in the world.

Well, it's true, I have worked for its preparation, I am still working for its maintenance and updates, so my opinion could be in some way influenced by this situation. Certainly it is not influenced by the fact that my company is selling software for the calculations in accordance with EN 13445, because **we also sell software in accordance with the ASME Code** (divisions 1 and 2), **with the German Code AD 2000, with the Italian ISPEL codes VSR and VSG**: until the number of standards to be used with the Pressure Equipment Directive will remain high, every Manufacturer will have to buy and keep up to date software licenses in accordance with all the possible standards, not only with one of them, which of course means a greater turnover for my company. In any case, if you don't share my opinion about EN 13445, **can you tell me the reason why the Americans, in the new coming issue of their ASME Section VIII division 2, have taken so many ideas from that standard?** I would only mention one of them, a very simple one: the **reduction of the safety factor on the tensile strength from 3 to 2,4** (by the way, with the "Design by Formula Amendment", EN 13445 has gone still further, allowing a reduction from 2,4 to 1,875, provided addition safety measures are met).

Funny situation: 12 years to prepare a European standard on Pressure Vessels, plus 5 years of maintenance and updates (the Migration Help Desk has just issued the 24th amendment of the standard), **a lot of money coming from the European Commission** (our money at the end, because the European Commission is financed by the European citizens: Belgian, British, Dutch, French, German, Italian, Portuguese, Spanish citizens are all European citizens, even if many of them have still some doubt about this kind of double identity: probably more doubts than the new European citizens coming from the Eastern European countries). And this **just to help our American friends to improve their national Pressure Vessel code.** Well, at the end it's all right: **for years the European Pressure Vessel codes have taken ideas from ASME or from other American sources:** just to make an example, **the Taylor Forge method for Flanges**, which was thoroughly copied in the French CODAP, in the British PD 5500 and in the Italian VSR. Or **the Tubesheet design method**, taken from a series of papers (1948-1960) of **K.A. Gardner**, which was the basis not only of the American TEMA and (later) ASME method, but also of the French CODAP, of the British PD 5500, of the Dutch rules for Pressure Vessels and of the Italian VSR. Not to mention the **Welding Research Council Bulletins for Local Loads**, the **Zick's method for horizontal vessels on saddle supports**, and the entire philosophy of **the Stress Categorization in the rules for Design by Analysis** (these latter transferred from the ASME code into all the main European pressure vessel standards). Even **EN 13445 still takes into consideration some of these methods as a basic solution** (Flanges in Clause 11, Tubesheets in Clause 13, Design by Analysis in Annex C), while, on the other end, it provides **more modern methods (based on limit analysis) as an alternative** (Flanges in Annex G, Tubesheets in Annex J, Design by Analysis in Annex B). Therefore to make problems because the trend is now going (for the first time in the history of Pressure Vessel Technology) into the opposite direction, from Europe to the United States and not vice versa, is, in my opinion, absolutely silly.

In our latest newsletter (made in September 2006) I tried to analyze **the reasons why the European national Pressure Vessel standards are always so vital**, although so many efforts have been spent in the preparation of a modern European CEN standard. My conclusion (which up to now has not been opposed by anybody) was that **in certain countries there might be some peculiar interest of the Organization publishing the national code**, which is sometimes different from the national standard organization associated to CEN, and therefore **is not obliged by the CEN rules to withdraw the publication of the corresponding national standard when a CEN standard is approved**. I also mentioned **the case of UK**, the only European country where, on the contrary, **the Pressure Vessel standard (BS 5500) was published by the national standard organisation (BSI) and not by another entity**: well, even in this case the national Pressure Vessel is surviving, regularly maintained and updated by a team of qualified experts. How is this possible? With **the simple trick of changing its name in PD 5500**, where PD stands for **Published Document**. Of course a PD is not a BS (British Standard), and therefore there was no obligation to withdraw PD 5500 after the publication of EN 13445.

Funny, isn't it? Particularly if you consider that **BSI has the chairmanship of the CEN Technical Committee (54) which has prepared EN 13445**, and is therefore responsible for its update and continuous development. It is true that now **the great majority of projects concerning EN 13445 is carried out by the most important Working groups**: A (General), B (Materials), C (Design), D (Fabrication), E (Inspection), and no one of them is chaired by BSI. Also the **MHD** (Migration Help Desk, responsible for the **interpretation and correction of errors**), is chaired by AFNOR, not by BSI. Therefore is not surprising to read the **comments made by BSI about a possible new edition of EN 13445**:

“This is a mature industry with a high profile safety focus, currently under severe financial constraint. As currently presented, there is no commercial incentive to use the multi-part EN 13445. We strongly recommend that before progressing too far with the proposed new edition, CEN should discuss this with the industry operators responsible for making the decisions that govern the selection of standards. Whilst it is accepted that the proposals for amendment, currently in process will improve the viability of application, the usability issue, engendered by the multi-part structure will remain and requires positive action”.

Trying to give an interpretation: **“Why the Pressure Vessel industry should use EN 13445? There are so many nice national codes (particularly PD 5500, Published Document sold by BSI only) that are certainly better known! So, boys, don't be silly, forget a possible new edition of EN 13445, better to throw everything into the basket! At least, once the Commission gave us some money: now, that access to funding has become more difficult, there is no reason why we should overstress ourselves”.** (I repeat, **this is only my personal interpretation**: I would be obliged to anybody capable of giving me a better one, also explaining which are the **“usability problems”** caused by the **multi-part structure**).

Well, **I don't want to say that EN 13445 is perfect**. Many things are still to be improved. I find more constructive and worth to be considered the **comments made by Belgium**, particularly on **part 5 (Inspection)**, whose prescriptions are sometimes **more stringent than the corresponding prescriptions of other Pressure Vessel standards**. But, of course, improvements can only be carried out by people who believe in them.

By the way, **on June 11th Sant'Ambrogio is organizing a conference in Brussels, at the CEN Meeting Centre, on EN 13445**. The conference will be **mainly focused on part 3**, but my friend **Piet Verbesselt will also deal with the other parts** (particularly 2, 4 and 5). Hoping to convince European people that European standards have been made for them, even if they can be useful also for the Americans.

Fernando Lidonnici

What's being cooked up?

Our **graphical interface** is rapidly progressing: the idea is to give the software users the **possibility of making a 3D drawing of the vessel while performing the calculation** of the various components, thus transferring automatically the necessary information from one component to the other. The graphical interface is already working: you can now build a vessel by joining together, for example, a cylindrical shell, a torispherical end and a flange: **when you are joining the end to the shell the end ID will be taken by default equal to the shell ID**. Then you are able to put **nozzles** on the shell or on the end, by **calling on the screen the table of standard pipes** and selecting the proper diameter and thickness. In the same way you are able to complete a nozzle with a standard flange, and so on.

The graphical interface **will become the basis of all our code packages (VSR, AD 2000, ASME Section VIII division 1 and 2, EN 13445)**. The first package will be **ASME Section VIII division 2**, which now is still a DOS program: according to our information, **this code will be completely revised**, so we will take this opportunity to make a complete revision also of our software. **Edition 2007 of ASME Section VIII division 2 is expected for July**, and will come into force on the **1st January 2008**. We will do our best to be ready with the software for this date.

Note that **all the licensees will receive the new software versions with the graphical interface in the context of the existing licence agreement**, without additional charges.

We are also working to an improvement to our software in accordance with **Section VIII division 1**, which is the **automatic calculation of the Minimum Design Metal Temperature**: this will involve some modification in our **material data base**, with possible duplication of some materials, where the curve to be used for the calculation of the MDMT is depending on the heat treatment. However further modifications have to be carried out in the calculation module of each component, because of the different meaning of the **“governing thickness”** used to determine the MDMT on the curve. This improvement is expected shortly, certainly before the new edition of ASME Section VIII division 2.

EN 13445 is always giving us a lot of work, we are now at the **25th issue**. We are doing our best to keep the software updated. One of the next updates will be the so called **“Design by Formulae amendment”**, which, as explained above, will **reduce the safety factor against the tensile strength at room temperature from 2,4 to 1,875**, if specific **additional measures** are met: this means that the standard will become suitable also for **Fine Grained steels** (for example, plates of EN 10028.3), which have a **yield point very close to the tensile strength** (the actual safety factor of 2,4 involves an unacceptable reduction of the nominal design stress of these steels). The rules for **Creep**, that have already been approved in the Public Inquiry, will be also covered in a next issue. These rules will involve **heavy modifications to the software**: for the calculation of any vessel component in the creep range (that is, at temperatures where the deformations under a given stress will progressively increase with the time) we will have to define first **whether the vessel will be monitored in service or not**, and then what is the **expected lifetime at the design temperature**. Nominal design stresses will be dependent on these data.

We welcome our new licensees:

- 9 new licensees for our software for mechanical calculation of **pressure vessels & heat exchangers to the Harmonised Standard EN 13445-3**
- 9 new licensees for our software for verification of **horizontal & vertical vessel on supports to the Harmonised Standard EN 13445-3**
- 8 new licensees for our software for mechanical calculation of **pressure vessels & heat exchangers to ASME VIII div. 1 / TEMA + UHX**
- 8 new licensees for our **CARVES** software for calculation of **local loads to WRC Bulletin 107 / 297 and ASME VIII div. 2**

- 7 new licensees for our software for mechanical calculation of **pressure vessels & heat exchangers to VSR**
- 6 new licensees for our software for calculation of **local loads** to the Harmonised Standard **EN 13445-3**
- 5 new licensees for our software for **fatigue assessment** to the Harmonised Standard **EN 13445-3**
- 5 new licensees for our software for calculation of **towers under wind and seismic loads** in accordance with the **Brownell / Young method** with calculation of allowable stresses as provided for in **EN 13445-3**
- 4 new licensees for our **ZICK** software for calculation of **horizontal vessels on saddles** to **Zick method / PD 5500**
- 4 new licensees for our software for mechanical calculation of **pressure vessels & heat exchangers to AD 2000**
- 3 new licensees for our software for **fatigue assessment** to **AD 2000** Merkblätter **S1 & S2**
- 2 new licensees for our software for verification of **expansion bellows** to **EJMA**
- 1 new licensee for our software for checking of **mounting** and **support structures** to **AD 2000** Merkblätter **S3/1, S3/3, S3/4** and **S3/5**
- 1 new licensee for our **COLOAS** software for calculation of **towers under wind and seismic loads** in accordance with the **Brownell / Young method** with calculation of allowable stresses as provided for in **ASME VIII div.1**

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