SANT'AMBROGIO Newsletter – October 2010

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The European Pressure Vessel standard: the most advanced Pressure Vessel standard in the world or a stupid waste of money?

In our preceding Newsletter (November 2009) I tried to prove that **the interest of all the European industry (manufacturers and users of pressure vessels)** should be the **adoption of a single European Pressure Vessel standard**. In all the other industrial compartments European standards are in fact progressively replacing the old national standards: so that in France, UK, Germany and Italy the old NF, BS, DIN, UNI… standards are now replaced by European standards designated as NF EN, BS EN, DIN EN, UNI EN… In fact AFNOR, BSI, DIN, UNI, etc. are all members of **CEN, the European Federation of the national standard organisations**. According to the CEN statute, the new ENs, prepared by CEN Technical Committees and Working Groups, are approved by weighted majority in a specific Public Inquiry. **When a CEN standard is approved, all the CEN members are obliged to adopt it withdrawing the existing national standards dealing with the same subject**. This is the reason why CEN was officially charged by the European Commission to prepare the **"Harmonised Standards"**, which should give the so called **"Presumption of Conformity"** to all the **industrial products covered by the "New Approach" technical European directives**. A specific **"framework agreement"** was established between CEN and the Commission, providing a financial support for the preparation of the harmonised standards. **Detailed contracts** were then signed for each specific **"work item"** dealing with the preparation of a new standard or for the relevant amendments and additions.

In fact a European Pressure Vessel standard already exists**: EN 13445,** prepared by **CEN TC54** (chairmanship assured by BSI) and by its **Working Groups** dealing with **Materials**, **Design**, **Fabrication**, **Inspection**, etc. Each WG has a different Convenor, and its work is organised and directed by one of the CEN members. The **first edition of EN 13445** was first published in **2002**, the second one (already arrived at its second issue) was published at the end of last year. It has required **20 years of efforts of many European experts** working for manufacturers, users, engineering companies, notified bodies and standardization bodies. It is **one of the most advanced pressure vessel standard in the world**, in the sense that its use allows a **substantial reduction in thicknesses, weights and costs** of the vessels without decreasing their overall degree of safety and always assuring compliance **with the Essential Safety Requirements of the European Pressure Equipment Directive (PED)**. Of course compliance with the ESRs of the PED may also be achieved using other standards: EN 13445 is therefore **not at all compulsory**, and this is the main reason why it has to face the **competition of other European and American Pressure Vessel standards** (on which, by the way, it had also a strong influence, as I will show later on).

Unfortunately, EN 13445 has **many enemies**, who are trying in all possible ways **to stop its use and its further development**. Let's try to see who these enemies are, and which arguments against it they have.

The first enemy is no doubt the European Commission. Surprising, isn't it? Particularly if you think of the **terrific amount of money** (some million Euros) that the Commission spent in the past to finance the creation and the development of the standard. However absolutely normal, if you consider that **the Commission's employees**, well aware of the Christian matrix of Europe, are simply **applying the Gospel**: and the Gospel says **"don't let your left hand know what your right hand is doing"**. Considering this rule it is possible to understand the actual situation: **the right (operating) hand of the Commission**, the same that has given in the past so much money for the financing of EN 13445 and which is still responsible for financing the European standardization system, **is now trying to promote this standard** through questionnaires and

meetings; at the same time **the left (bureaucratic) hand of the Commission**, completely ignoring what the right hand is doing, **is trying with all possible excuses to recover some of the money already spent in the past**. This is done not only by **refusing to make payments already agreed** for specific work items on EN 13445 completed some years ago, but also **requiring reimbursement of payments already made for much older work items**. The amount of money involved is considerable, some hundred thousand Euros: the excuses for this are that the **Commission's rules** (modified some years ago) forbid subcontracting, unless the standardization body involved can prove that a suitable inquiry had been made for the work item concerned, and that the lowest bidder had got the order. I have already mentioned in a preceding newsletter the fact that **Sant'Ambrogio, which since 1995 by agreement with UNI assured convenorship and secretariat of WG "Design" of CEN TC54,** owing to this pedantic excuses has lost about **21000 Euros**. **UNI,** at its turn, received the request to give back **almost 3 times this amount**, while it seems **much higher figures were requested from BSI**. It is really a pity that this sad history was not discovered at the beginning, but only at the end of the work (at that time we had continuous contacts with the Commission, unfortunately only with the right operating hand, not with the left bureaucratic one – next time before signing a contract we will read carefully the Gospel, or wait until Turkey will become part of the European Union). **Nevertheless, we are going on**: **UCC-ANIMA, the Italian Association of Pressure Vessel Manufacturers**, is now assuring the secretariat and the payment of my travel expenses, as well as the travel expenses of other experts. But, as you can easily imagine, **the attendance of experts is greatly reduced**, and **no one of the standardisation bodies involved is even willing to try to set up new financial requests to the Commission** on any new work item, although **we still need to work on several important items in order to complete or improve the standard**. In the specific case of Italy, **UNI is also refusing to make the translation into Italian of the standard** (available only in English, French and German, the three official languages of CEN), even considering that the Commission has provisions for financing the translation of standards into the various national languages: they fear (and nobody can blame them for this) that **the right hand will sign an agreement at the beginning, while the left hand will refuse payment at the end**. I really do not know whether somebody in the Commission is realizing that **their behaviour risks to bring EN 13445 to a complete stop**, **thus throwing into the basket all the money spent up to now.**

A **second category of enemies** are all the **industrial associations** that in **France, Germany and UK are still publishing the old national Pressure Vessel standards**, sometimes with the help of the same experts who once had worked at the preparation of EN 13445. In fact these **experts are the last individuals of a species which is becoming extinct**: generally old retired engineers, fond of their profession, looking for a natural habitat where they are able to go on working, rounding up a little bit their pension if possible. **Of course a more favourable habitat is offered to them by these associations**, which in the past were able to promote the use of their standards also outside the borders of their countries of origin, and therefore **are now reluctant to give up the profits made by selling the new editions** (generally at prices much higher than the prices requested by the standardization bodies for EN 13445). For these reason **national committees still exist in France, Germany and UK which meet regularly for the further update of the relevant national codes.** But if in these countries the industry has to finance this work, and if the situation with the European Commission is the one I have described above, it is clear that **there are no resources left for financing the European Pressure Vessel standard**. If you ask somebody in these associations, he will swear that his national Pressure Vessel code is the best one in the world, that EN 13445 has not yet a sufficient experience of use, and that in his country everybody still prefers to use the national code only for the sake of safety (all comments are left to the reader).

Another category of enemies are **many important notified bodies**, particularly the bigger ones of them, having local offices outside their country of origin. Of course at home they prefer and promote the use of their national Pressure Vessel code: but in many cases their foreign local offices show **a definite preference toward the ASME code** (particularly Section VIII division 1) more than towards the harmonized standard. Even if many of them are also authorized **ASME**

inspection agencies, and therefore they are normally using the ASME Code for vessels directed outside Europe, in Europe they are notified for vessels conforming to the PED. Therefore it is less understandable **why they consider the American Pressure Vessel code as being more in line with the PED than the harmonised standard**. It is true that the choice of the code is generally made by the user, particularly in the case of **Italy**, the European country where there is probably the greatest concentration of manufacturing shops, and where **no national committee is working any more at the maintenance of the old local Pressure Vessel standard** (the **ISPESL "Raccolte"**). The result is that the ISPESL "Raccolte" are still in use for the local market, while for export to Europe ASME VIII division 1 is becoming the most popular code, and the use of EN 13445 is limited to a small number of products.

But let's come now to ASME**, the American Society of Mechanical Engineers**: I cannot really designate this association as an "enemy" of EN 13445, for two very important reasons: first of all, because I am a member of ASME since 24 years; the second one is that, at the end, although in many public occasions ASME has tried to prove that the use of the ASME Code is giving to products the same presumption of conformity as the harmonised standard, **in practice they are giving a lot of attention to the work that we have done in TC54**. Starting from 2007, **ASME VIII division 2 is considering for carbon and low alloy steels the same allowable stresses** as the harmonised standard. This is also true for the **hydraulic pressure** (same rule as the harmonised standard), for **Design by Analysis**, where now also plastic analysis has been considered as an alternative to the traditional elastic analysis, for **Fatigue**, where now there is a clear distinction between fatigue on welded and fatigue on unwelded components, like in EN 13445.3. So that **the difference in weight and costs between vessels fabricated in accordance with EN 13445 and vessels fabricated in accordance with division 2 are much smaller than with the previous 2004 edition**, although **considerable differences still exist for division 1** (differences in the range **15 to 30%** are normal for **large pressure vessels**, while **division 1 can give some advantage for small vessels,** where the greater amount of testing required by EN 13445.5 may penalize the European standard in comparison with division 1). At the end, until the entire European standardisation system will not achieve the same degree of completeness and coherence of the American system, **the ASME Boiler and Pressure Vessel Code will remain the Pressure Vessel standard more used in the world**, also for contracts outside U.S.A. **What however cannot be said, is that the ASME Code gives presumption of conformity with the European PED**: **the American and European safety systems on pressure equipment are basically different** (the first one based on strict conformity of all products with the applicable Code, the second one requiring a detailed "risk analysis" that considers each product as a single specific case - I have better explained these differences in the paper that I presented at the **PVP conference of last year in Prague – PVP 2009 77273 "Cross comparison of European and American Pressure Vessel Standards in the Design of the Main Pressure Vessel Components"**).

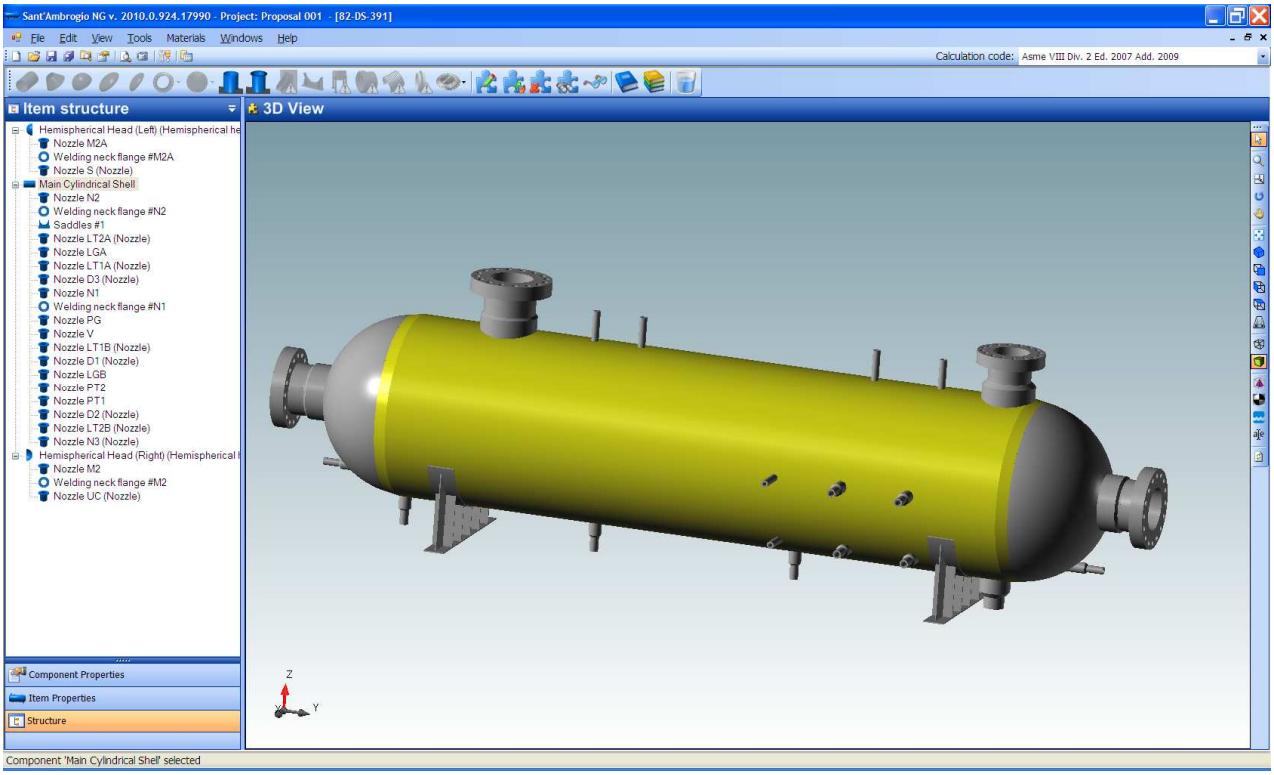
At the end, considering the actual situation, **what kind of future can we imagine for our European Pressure Vessel standard?** I hope to receive an answer from whoever is willing to give his contribution.

Fernando Lidonnici

What's being cooked up?

Our new software (**"Next Generation"**) is rapidly progressing. It covers now the **2007 Edition of ASME Section VIII division 2 and all the subsequent addenda,** and is being updated with the 2010 edition of the Code. The same software is being **extended also to ASME Section VIII division 1**, for the moment however considering the vessels only: the first "**beta versions**" have been distributed to a **selected number of licensees** which have already the classic edition, in order to get their comments (by the way, we wish to remind that **for all the licensees of our ASME VIII division 1 – classic edition, the new software will be delivered within the framework of our update service, without any further costs**). In any case further development

of the classic edition is still going on: the software includes now also the **calculation of rectangular vessels for ASME VIII div.1, for EN 13445.3 and for AD 2000**, and, for those who have e **licence of the software CARVES (calculation of nozzle loads)**, there is now (as anticipated in our preceding newsletter) **a switch which permits a quick connection between the two programs** without the need of repeating input data. The same characteristic has been provided also for EN 13445 and AD 2000; **in EN 13445 there is the further possibility of using either Clause 16 or WRC 107/287** (waiting for an update version of Clause 16, which should take into account all the six load components instead of the present three components only).



We are also studying a further **update of the software for calculation of towers** (the program **COLOAS** based on ASME Section VIII division 1 and the relevant **module in the EN 13445 software**). The update will concern the possibility of considering **different allowable stresses either for tensile or for compressive loads**, for all the possible conditions (**service, exceptional and hydraulic test**), to be calculated on the basis of the wind/earthquake standard used (**ASCE** or **EN**). A **better model for the seismic analysis** will also be used.

A subject which is always causing doubts is the **calculation of the hydraulic test pressure**, particularly in the standards which should assure **compliance with the requirements of Clause 7, Annex I of the PED**. The problem has been easily solved in the **NextGen software**, because it considers **the vessel in its entirety**, while the classic edition, which considers the single components independently from each other, needs **a further tool in order to choose the hydraulic pressure by comparison among the calculations already made for the components**. This tool is now available for **EN 13445, VSR and ASME VIII div. 1** (this latter package gives also the possibility of calculating the hydraulic pressure as a function of the design pressure or the Maximum Allowable Working Pressure, as permitted by the Code, and it has the further additional option of generating the hydraulic test pressure required by the PED, which is generally higher than the pressure required by the Code). The same tool is now in preparation for **AD 2000**.

In these days **our Engineering Department is particularly busy in Heat Exchanger and Pressure Vessel design** for many Italian manufacturers. All these Vessels are for plants located

outside Europe, and the majority of them are to be calculated to **ASME Section VIII div. 1 and div. 2** (which is for us a good opportunity to **test the revisions of our software**). By the way, **the fact of being the first users of our software gives us an advantage on most of our competitors**, allowing the quick discovery of all the possible bugs and problems. A further advantage is that **we are able to supply to our licensees not only a generic assistance on the use of the software, but also a specialised consultancy service on the codes themselves**, because all our engineers (not only the software writers) have en experience in codes and standards they normally use.

We are also particularly busy in **Thermal Design of Heat Exchangers**, since many engineering companies even at the bid stage are usually requiring from their suppliers of Heat Exchangers a **performance guarantee**. Well, using **HTRI software** we are able to offer not only such guarantee for exchangers already designed, but also to **develop a complete original thermal design** starting from any thermal specification sufficiently completed with all the necessary thermal data.

We welcome our new licensees:

3S Saldature Speciali Segrate Srl – Cambiago (Milano) - **ITALY**
CASAF Snc – Masone (Genova) - **ITALY**
CEMIT Srl – Taranto - **ITALY**
Consorzio PASCAL Srl – Milano - **ITALY**
GDN Srl – Soresina (Cremona) - **ITALY**
E-TECH Srl – S.M. Maddalena (Rovigo) - **ITALY**
FAI Officine di Carvico – Carvico (Bergamo) - **ITALY**
I.M.Q. SpA - Milano - **ITALY**
ITALPROTECH S.a.s. – Cavenago di Brianza (Milano) - **ITALY**
NECSI Srl – Romano d'Ezzelino (Vicenza) - **ITALY**
NYMO Education – Langhus - **NORWAY**
Officine MARALDI Bertinoro SpA – Bertinoro (Forlì-Cesena) - **ITALY**
SINTECNICA Srl – Cecina (Livorno) - **ITALY**
TENARIS Dalmine SpA – Dalmine (Bergamo) - **ITALY**
TÜV Austria Romania – Bucharest – **ROMANIA**
ZORZI INOX Srl – Rustega di Camposampiero (Padova) - **ITALY**

ISPESL Roma - **ITALY** (*user of Sant'Ambrogio software for research & study purposes*)

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