

The component database of PDMS application in Jack-Up-Drilling-Ship

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【 Abstract 】 VANTAGE PDMS is Integrated specialized integration arrangement design database platform。 It could be used to design the most difficult point of the project—the detail design of the Pipeline. And it also could be used to design the equipment , structure , HVAC , CableTray and other specialties' detailed design . This article Main researches that the database of VANTAGE PDMS is used to the pipeline's application in the project of the Jack-Up-Drilling-Ship. It includes the Catalogue (CATA) of pipeline , the Spec-world (SPWL) of Pipeline , Bolt Tables (BLTA) and so on . This article expatiates the main method to the way of the CATA's construction and also researches the problem in the process of the CATA's construction . In this article I give the matters needing attention in the designing process which used the database of this software (VANTAGE PDMS) and has discussed the solution of the partial question.

【 Keywords 】 Bolt Tables (BLTA), Catalogue (CATA) , Spec-world (SPWL) ,VABTAGE PDMS

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Introduction

VANTAGE PDMS is a 3D design software which is developed by the company of AVEVA . It has formidable construction of the 3D model and the charting function , and it also could find the question immediately while designing . Not only so we also could use it to Roaming and take the simulation of the Construction progress . By using it we could raise the rated capacity , reduce the design cycle , and also would course the design level going on a new stair .

The database of PDMS is very simple and logic . It's based on strict level and dendritic structure build . The establishment of the CATA of the Pipeline is the foundation of the 3D design . These data's integrality , veracity would influence to establish the 3D model and extract each kind of blueprint , materials list . Therefore the reasonable planning database , accurate establishing database would be especially important . Since 2004 Offshore Oil Engineering Co. Ltd has been first using the 3D design software of VANTAGE PDMS which is applying in China off-shore oil domain . And then we use it in the project of XJ23-1 , the project of HZ25-3/1 and so on and do them very well . But the Jack-Up-Drilling-Ship project is the first time to utilize this software , and this project is different from the former project , because the standard of low pound level which the owner requested must be used GB code . And in the material this project uses PE , 30CrMo and so on that is different from the former platform project .

1 the Catalogue (CATA) of pipeline of PDMS

1.1 the standard of the database

This project uses the standard of ANSI and API for the Pipeline and fitting of high pound level and use the standard of CCS , ABS , GB8163 , GB/T10752 , GB/T2506 and so on for the Pipeline and fitting of low pound level . The CATA of VANTAGE PDMS is used the standard of ANSI , but if we want to satisfy the request of the database of the Jack-Up-Drilling-Ship , we must first consummate the original database and then in the foundation of the former database add the special part which satisfies the GB code material .

The Jack-Up-Drilling-Ship project's database is established by the CATA which include of the part of the former database and the other part of the database of request by this project . The constructed database by ourselves includes the GB code part , special CATA part and so on .

1.2 Part's naming

The each element in the Jack-Up-Drilling-Ship database's would have only one name , and VANTAGE PDMS has provided a set of completing standard coding system .

1.3 Increases part's method

Part's increase method has two kinds: One kind is the use the method of "the copy - revision" . We can refers to some similar or the close part , using tools of "Tools/Copy Category" , copy CATA to in the Jack-Up-Drilling-Ship's CATA database , and then rename them , carry on the revision parameters. For example in the figure1's TEE which is according to the GB code , we could make over the TEE according to the same caliber and the same type of connection TEE which is according to the ANSI code .

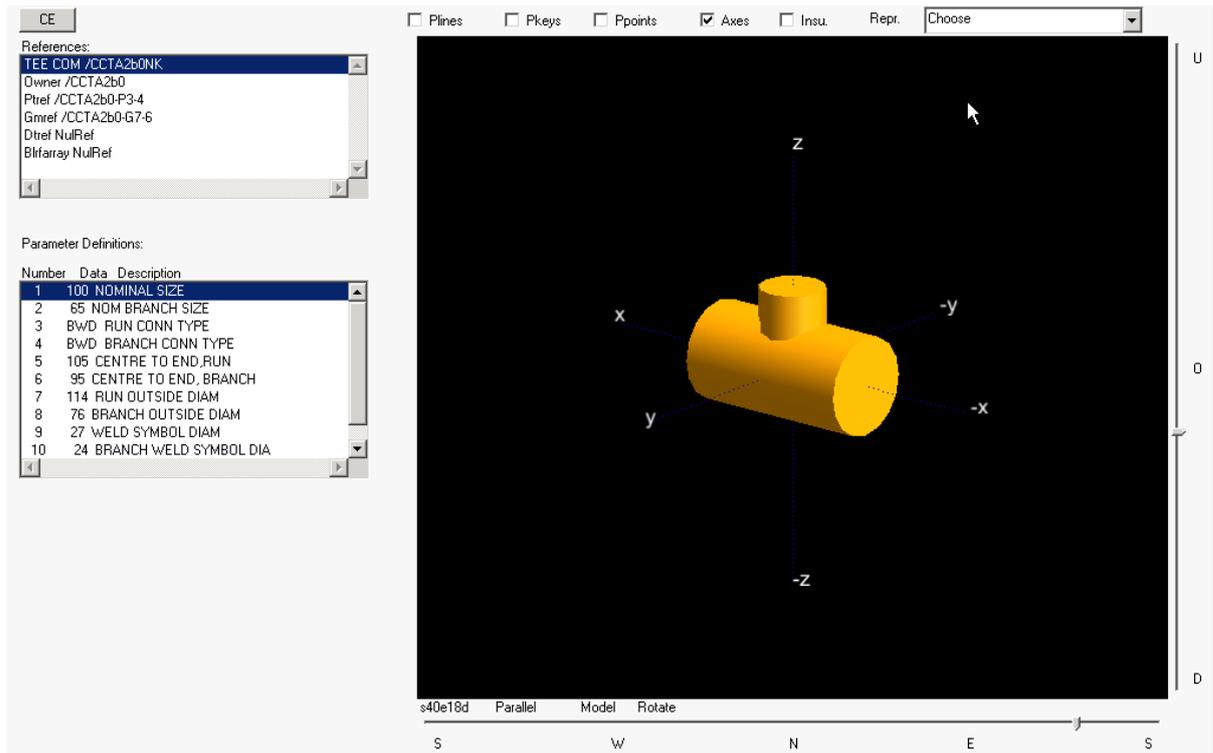


Figure 1: TEE for the GB code[2]

Another kind is that we could anew establish the part . Now we take a 90° bend according to the GB code as an example . (figure 2)[1]

Firstly , we take the management : establish the management.

Secondly , we fix on the parameters : first we determine the bend's five parameters ——1. NOMINAL SIZE, 2. CENTRE TO FACE, 3. CONN TYPE, 4. OUTSIDE DIAM, 5. WELD SYMBOL DIAM . When we setup the parameters we must pay attention to that the first parameter must be the NOMINAL SIZE for entrance . And then we take the points and the graphics .

Thirdly , create part : first we use “Create >Component” to create the bend , and then separately input the bend's five parameters . We must pay attention is that the part which has been created must be put under the PTSE .

Fourthly , creating the points : The set of points is the set of the junction points of the part and the reference points . We use “Point Set>Primitives>Axial P-point(PTAX)” to separately create the bend's points of P1 and P2 .

Fifthly , creating the graphics : At last we need to create the graphics . Graphics which is the part's graphic is the set of the basic figures . The process of the creating the graphics is like to creating the equipment , that is we use the basic figures to create the part's externality . So we first must confirm the graphics , and then create the bend's figure by using the points of P1 and P2 . Finally we create the centre line and the welding points .

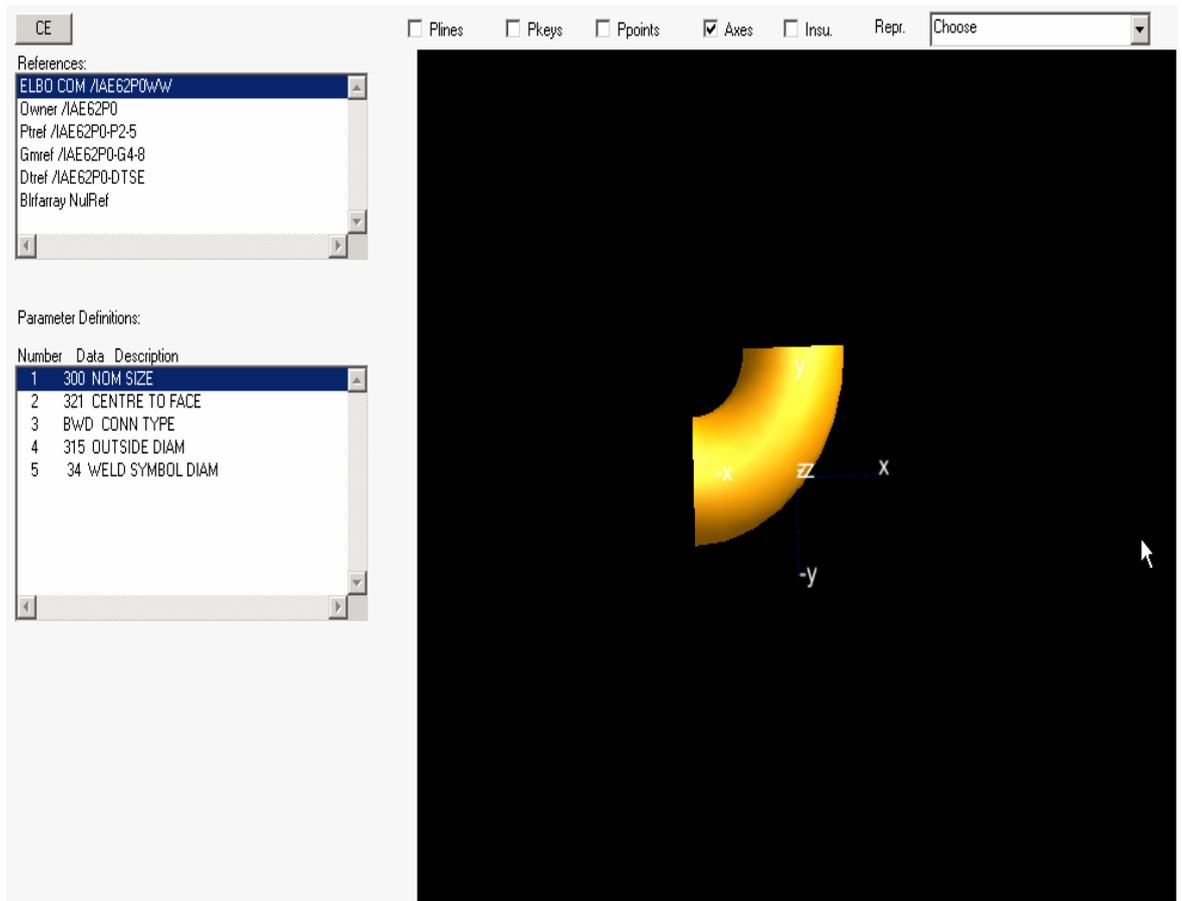


Figure 2:creating a 90° bend[2]

1.4 the part's description

The part's description mainly use in describing part's geometrical shape and the characteristic . In creating the rank , the material report , the materials list for Isodraft it will be used , and it comes down to the charts expression whether they are correct and up to snuff . VANTAGE PDMS retained 3 attributes to use in the part describing , respectively was RTXT、STEXT and TTEX , but that could not surpass 120 characters . Detail corresponds RTEXT , Interface B corresponds STEXT , and Interface C corresponds TTEX . These three attributes' usage is completely same , mainly use to output by the different language or the different form . Sometimes when a part needs multi-SDTE (description) may use CATVIEW to search these SDTE elements directly . For example when some safety valves which are in the identical size have 3 kinds of pressure ratings , we need to create 3 SDTE under the part of the safety valve (figure3) .

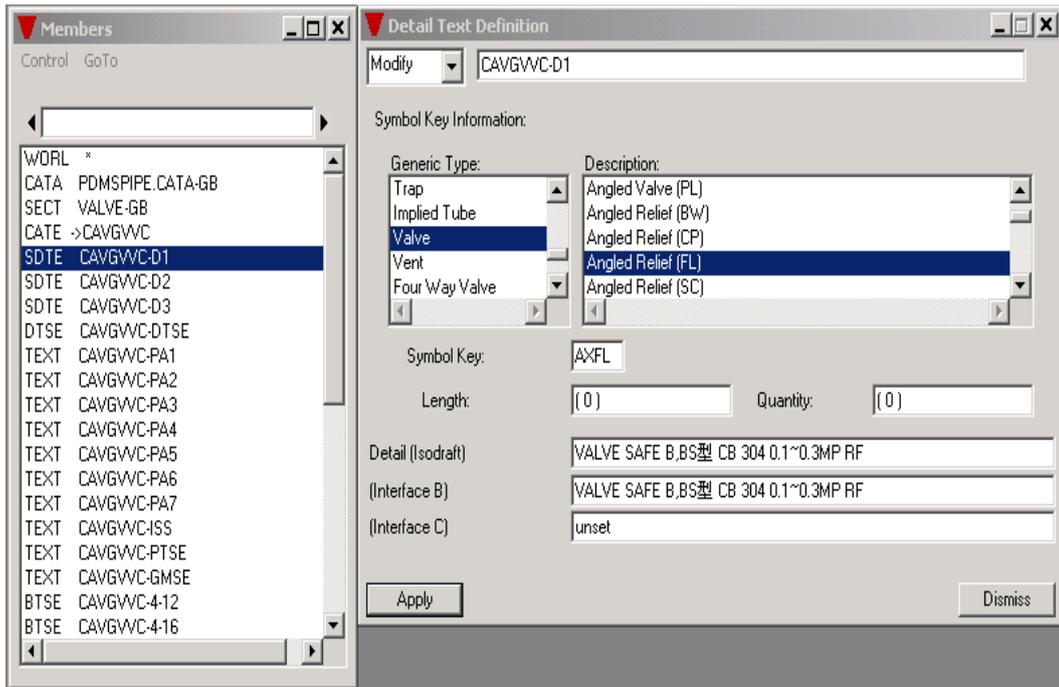


Figure 3: creating the SDTE[2]

2.Bolt table

The bolt table is a part of the Pipeline database . The contents of this part are not easy to pay attention to everybody. Because only on the last time that we compile the bill of materials , extraction ISO for Pipeline we would find the error message in the bolt table . So I list it separately here . Below are some points that we should need to pay attention on the process of creating the tables :

Bolt tables' construction of data

The bolt tables are constituted by the standard measure of length table for the bolt , the affixation measure of length table for bolt , the rank table for bolt , the diameter of bolt comparative table and so on . (That setting up the diameter of bolt comparative table is mainly used to respond the demand of the British system diameter of bolt for company .)

The quotation relation of bolt in modeling

In our modeling time , each Pipeline rank would quote the bolt rank . We know that the application of the bolt is depending on the diameter and length of the bolt , so the affixation measure of length table and the standard measure of length table lead to the length of the bolt . But the diameter of the bolt is depending on the attribute of the diameter of the bolt in the affixation measure of length table .

The construction of the bolt table

The bolt table does not look like the part table which has the interface of graphic establishment , it is completely a digitized contact surface . Some contents need people operate it outside the software , and add the attributes which must have . So the people who construct the database understand the bolt table's construction of data and the quotation relations .

- establishing the standard measure of length table for the bolt
- establishing the affixation measure of length table for the bolt
- establishing the description tables for the bolt material
- establishing the material tables for the bolt
- establishing the bolt rank table
- the Pipeline rank quoting the bolt rank

What we should pay attention to is that we must give the diameter unit of the affixation measure of length table for the bolt , otherwise when we get the Isodraft the bolt will not show the materials .

3.The rank table of Pipeline

The function of the rank table is to reduce the choice scope for the fittings . The relations of the PDMS' rank table and the part table is that each rank fitting points to one and only part in the part table . This kind of relation courses that the same fitting is identical in each rank , so that the artificial reason coursed the mistake that the same fitting had the different rank description using the former 3D software would not happen .

The 3D design software of VANTAGE PDMS is taking the part table as the foundation and taking the database drive the software of graphical .The graphic interface is pointed to by the rank table not by the part table directly . (figure4)

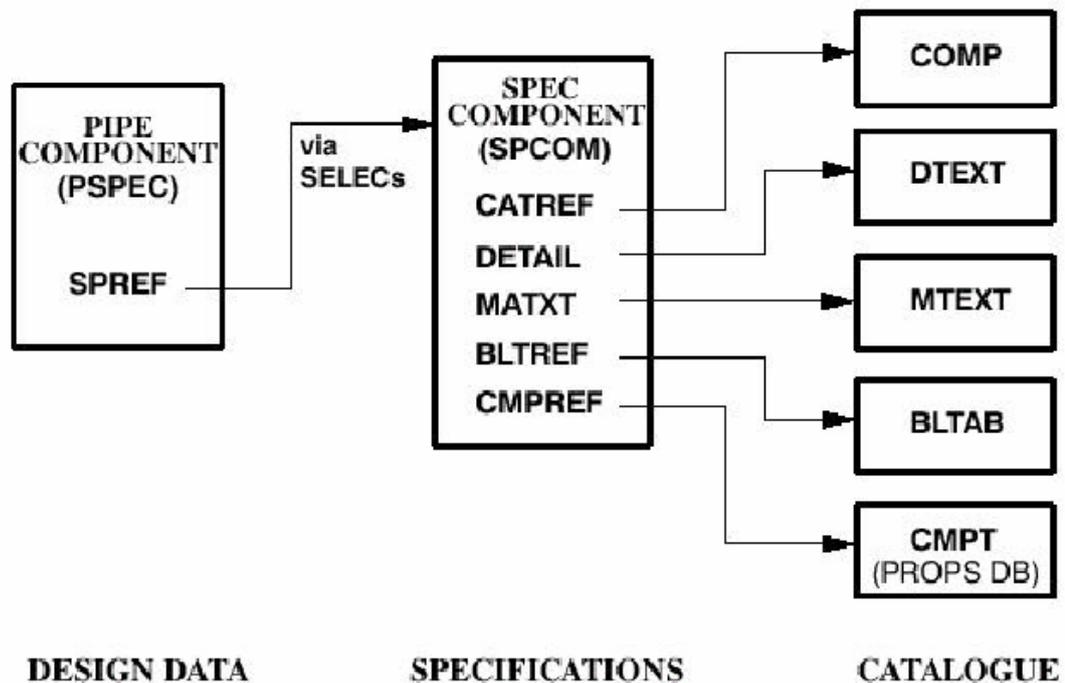


Figure 4:the rank table pointing to the part table[2]

We use the CATVIEW which is the maintenance tool under the module of PARAGON to add the parts to the part list of the rank table of Pipeline .

Using the “CATVIEW/BROWSE” could see the rank part list in the part storehouse . First we could use the software of “CATVIEW” to take the part (CATA) which we need from the part storehouse , and then choose the size of the part and the type of the material , and finally add the part into the rank which we need . We could find the new adding part in the part rank list .

The ranks of the Pipeline in this project have been established 9 ranks based on the owner requests and the material standards document , like the high-pressured well cementation was API 10000 psi and so on, the material aspect increased material of 30CrMo, PE and so on .

4. Conclusion and suggestion

VANTAGE PDMS is a 3D design software based on the database . But the 3D modeling , the correct and reliable of the final product and the rated capacity enhancement are based on the part storehouse and the rank storehouse are complete foundation . Building the general part storehouse and the rank storehouse, in order to it can be used in all projects . Along with the 3D design's accumulation and the part storehouse, the rank storehouse unceasing consummation , the rated capacity will have the enormous

enhancement.

In view of the fact that working in the drilling ship project , proposing several ideas in PDMS database :

For establishing the part table of Pipeline fast and accurately , we could use the number storehouse which is provided by AVEVA fully . The concrete procedure is that we refer to some similar or the close part, use tool collection Tools/Copy Category, copy CATE to the corresponding part storehouse, rename , and finally carry on revising the parameters .

When establishing the set of points we should pay attention to the following several points [2]:

- The three-way valve's hand wheel way point must be bigger than P3, and diameter is unset.
- The four-way valve must establish the points symmetry , the P1 corresponds P2, the P3 corresponds the P4 , the hand wheel way-point must be bigger than the P4, and diameter must be unset.
- The pan of the Eccentric Reducer without the point for connection must be pointed to the P3 for rotating along axial in designing, the P3 does not to establish the diameter and the connection form.
- The point for connection of the Eccentric Reducer with the point for connection must be the P3 , and the pan must be the point of the P, the P9 does not establish the diameter and the connection form.

Regarding some non-standard valve and fitting, resultingly they need to carry on the special design in the actual project movement according to the project situation. In the part table we will add a similar part on the earlier period and give it the description , and then when the factory provide this kind of part's attribute we will make the revision to the part storehouse. through this way we can guarantee not only the part would not be gaps but also the part's data would be accuracy during the design .

The atmospheric pressure pipeline is usually the slope tube . When the level and slope tube connects with the vertical tube, the straight length of pipe cannot connect automatically because of the special angle . we need to use zero length BEND to connect . Therefore, we must increase this zero length BEND in the part storehouse .

The establishing tubing database also needs to pay attention to the versatility , causing it suits not only to this project but also to the later project , namely all projects use the same part storehouse . This is the direction what we will work on .

Reference

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