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A NOVEL METHOD OF CONDITION MONITORING REPORT PRESENTATION

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ABSTRACT

Language plays a vital role in communication of any form. Written language, symbols, graphs and drawings are used appropriately for effective communication in technical reporting. Technical reporting is the gist of the activity carried out in any discipline. A novel presentation method has been conceived, developed and adapted in technical reporting of Condition Monitoring / assessment, which has been derived specially for inspection and testing services of any kind of component part or equipment. This method communicates effectively the scope, test methods, acceptance level of results based on codes / standard, action plan based on these acceptance level and remnant life of the individual/joints/spots and component and past history of similar tests carried out in a total perspective. A boiler drum is taken as typical example to high light this novel method of presentation. NDE methods which were carried out on the drum in the previous years, acceptance level and action plan recommended at that time are represented by green color square and rounded off callouts while the current NDE methods status are referred by blue square callout and action plan by red round off callouts. This novel method of presentation is adapted for the total condition monitoring / assessment of plant components of power and petrochemical sector.

KEY WORDS: Condition Monitoring – Blue Square Callout – Scope & Acceptance level – Red rounded off square callout - Action Plan - Green color callouts - Square and round off.

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INTRODUCTION:

In the process of trying to derive a method which could help the busy executives to get information in a flash, this concept of novel method of technical report presentation is conceived and developed. Condition monitoring / assessment reports are submitted to the industries based on this methodology. Table expresses concise way of presentation compared with words. But one has to read the tables. A picture is worth thousand words and it registers very well in mind as it is more expressive than words. A new methodology which is more expressive than words and tables have been presented to overcome this so that the information can be obtained in an instant and easy way. There are two layers of executives namely decision makers and executors. Top layer executives are interested about previous years and present time test, acceptance status, when and what kind of action was taken and to be taken in view of the total perspective of the component or components. Executors are associated in execution and are interested in the type of test, when and what kind of action to be taken on individual joints of the component or components. Considering steam drum as an example a novel method of presentation is enunciated in this paper as nomenclature, method and conclusion.

NOMENCLATURE OF NOVEL PRESENTATION METHOD:

Figure 1 and table1 show Legend of this methodology Green square callout – Test conducted and acceptance status in the previous inspections Green round off callout – recommended action plan in the previous inspections. Considering commissioned year as starting period (zeroth year), the years is referred in these callouts as follows. Color code refers acceptance level in legend Figure 1. Priority levels action to be taken are indicated by sectors from top to least priorities red to blue respectively in green round off call outs. Blue square callout -Tests conducted acceptance level of results of current inspection. Red square callout – Action plan by color right angle triangle (RAT) in consequence of current test results.

COLOR RAT - I Quadrant 1st year
II Quadrant 2nd year
- III Quadrant 3rd year
- IV Quadrant 4th year
- # Green 5th year

NDE method was not in the scope but carried out is shown by color stars. 16 squares – refers NDE method starting from top right side as shown in figure 1. A to Z refers remaining life 1 to 26.

Greek alphabet - ' ' % expended life + ' ' % expected remaining life

Greek $\alpha\beta$ % expended / expected remaining life

α	Alpha	1-10
β	Beta	11-20
γ	Gamma	21-30
δ	Delta	31-40
φ	Epsilon	41-50
υ	Theta	51-60
	Lambda	61-70
μ	Mew	71-80
η	Etta	81-90
Ω	Omega	91-100

TABLE 1 NOMENCLATURE YEARS

Year	Description
1 	Any one of sectors of Red, Pink, Green and Blue in I quadrant
 2	Any one of sectors of Red, Pink, Green and Blue in I quadrant
3 	Any one of sectors of Red, Pink, Green and Blue in III quadrant
4 	Any one of sectors of Red, Pink, Green and Blue in IV quadrant
 5	Black Sector + Any one of Red, Pink, Green and Blue sectors in the middle
6 	Brown sector + Any one of Red, Pink, Green and Blue sectors in I quadrant
 7	Brown sector + Any one of Red, Pink, Green and Blue sectors in II quadrant
 8	Brown sector + Any one of Red, Pink, Green and Blue sectors in III quadrant
9 	Brown sector + Any one of Red, Pink, Green and Blue sectors in IV quadrant
10 	Black semicircle + Any one of Red, Pink, Green and Blue sectors in the middle
11 	Brown semicircle + Any one of Red, Pink, Green and Blue sectors in I quadrant
 12	Brown semicircle + Any one of Red, Pink, Green and Blue sectors in II quadrant
 13	Brown semicircle + Any one of Red, Pink, Green and Blue sectors in III quadrant
14 	Brown semicircle + Any one of Red, Pink, Green and Blue sectors in IV quadrant
 15	Black $\frac{3}{4}$ circle + Any one of Red, Pink, Green and Blue sectors is in the middle
16 	Brown $\frac{3}{4}$ + Any one of Red, Pink, Green and Blue sectors in I quadrant
 17	Brown $\frac{3}{4}$ + Any one of Red, Pink, Green and Blue sectors in II quadrant
 18	Brown $\frac{3}{4}$ + Any one of Red, Pink, Green and Blue sectors in III quadrant
19 	Brown $\frac{3}{4}$ + Any one of Red, Pink, Green and Blue sectors in IV quadrant
20 	One black circle + Any one of Red, Pink, Green and Blue sectors in the middle

21 	Brown circle + Any one of Red, Pink, Green and Blue sector in I quadrant
 22	Brown circle + Any one of Red, Pink, Green and Blue sector in II quadrant
 23	Brown circle + Any one of Red, Pink, Green and Blue sector in III quadrant
24 	Brown circle + Any one of Red, Pink, Green and Blue sector in IV quadrant
 25	One black circle + one black sector + Any one of Red Pink Green and Blue sectors in the middle
26 	Brown circle + Brown sector + Any one of Red, Pink, Green and Blue sectors in I quadrant
 27	Brown circle + Brown sector + Any one of Red, Pink, Green and Blue sectors in II quadrant
 28	Brown circle + Brown sector + Any one of Red, Pink, Green and Blue sectors in III quadrant
29 	Brown circle + Brown sector + Any one of Red, Pink, Green and Blue sectors in IV quadrant
 30	One and half black circle + Any one of Red, Pink, Green and Blue sectors in the middle
31 	1 ½ Brown circle + Any one of Red, Pink, Green and Blue sectors in I quadrant
 32	1 ½ Brown circle + Any one of Red, Pink, Green and Blue sectors in II quadrant
 33	1 ½ Brown circle + Any one of Red, Pink, Green and Blue sectors in III quadrant
34 	1 ½ Brown circle + Any one of Red, Pink, Green and Blue sectors in IV quadrant
 35	One and ¾ half black circle + Any one of one black sector Red Pink Green and Blue sectors in the middle
36 	One and ¾ brown circle + Any one of Red Pink Green and Blue sectors in I quadrant
 37	One and ¾ brown circle + Any one of Red Pink Green and Blue sectors in II quadrant
 38	One and ¾ brown circle + Any one of Red Pink Green and Blue sectors in III quadrant
39 	One and ¾ brown circle + Any one of Red Pink Green and Blue sectors in IV quadrant
 40	2 black circles + Any one of Red Pink Green and Blue sectors in the middle

NOVEL PRESENTATION METHOD:

Scope of condition monitoring of the drum is given in the table 2 according to the conventional presentation method. In the novel presentation method, the scope itself is presented along with test results, acceptance status in the blue callout square as shown in the figure 2 and table 3. Various tests VT, DIM, MT, PT, UFD, UTG, IMG, Hardness, Insitu chemical analysis were carried out in the year 1999 as shown in the green color square callout. Visual Test and IMG are shown by blue sector in the first and seventh squares which refers as visual and IMG are satisfactory (blue color) This is shown by one and half black circles with blue sector. Other test results and their acceptance status are shown by one and half black circles with green sector in the respective squares of NDE methods indicating that these test results are acceptable as per codes / standards.

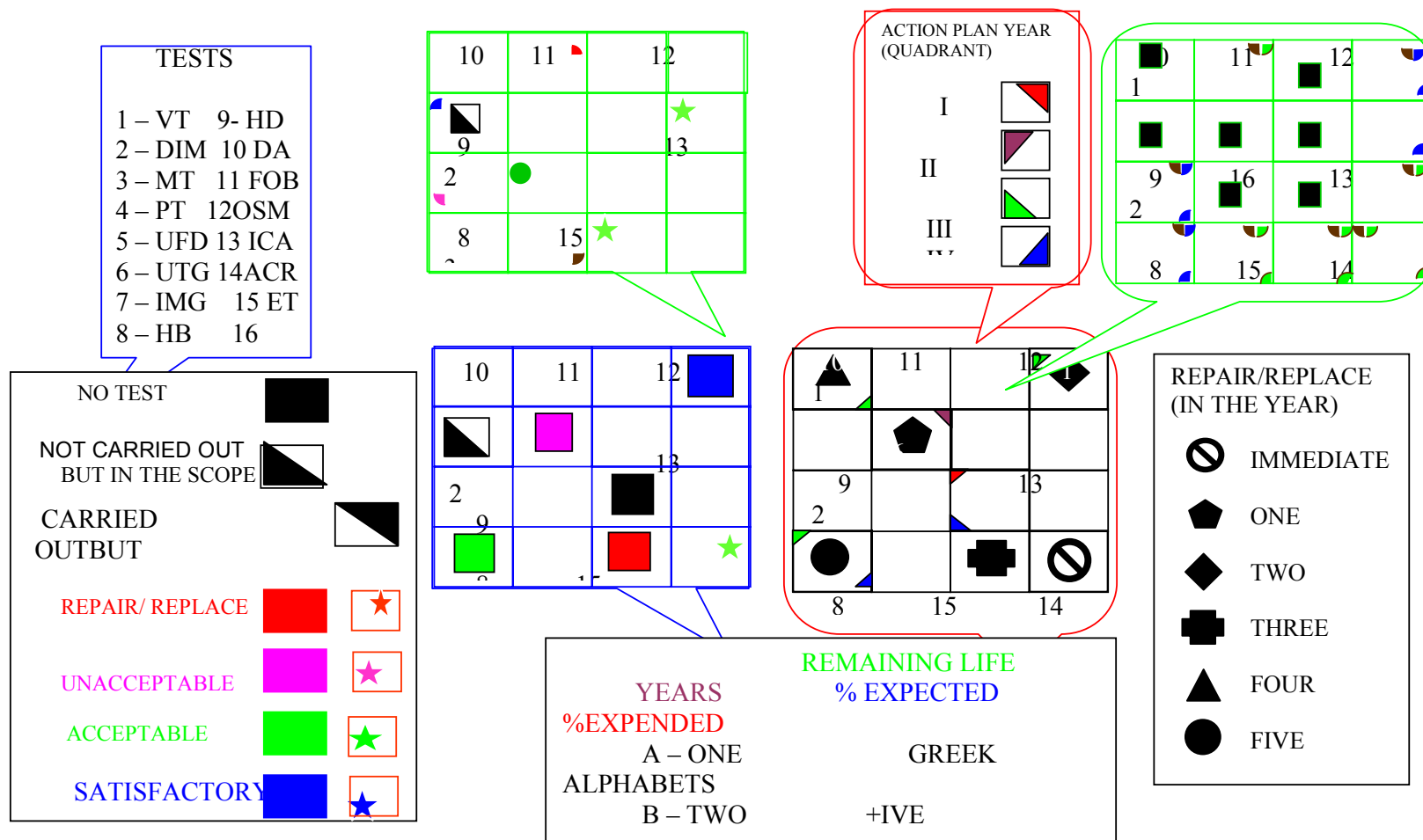
In the green round off square, the recommendation for further inspection is shown in figure 2 as sectors of respective colors in the corresponding squares the 3rd quadrant and at the middle of the square indicating that these tests should be carried out in the 33rd and 35th years (one and half brown circle with green sector and one and half black circle with green sector) considering commissioned year 1969 as zeroth year (starting period). In other words, tests should be carried out in the forthcoming years 2002 and 2004. All these tests were repeated in the current year 2002. The results, acceptance status and action plan are shown in the figure 2 as blue and red callouts .

Table 3 shows the novel presentation method of these data. Previous, current inspection status is shown in the table. Repair / replacement in the forthcoming years are shown as black regular shapes in the legend. Lowest acceptance level of current and immediate past inspections and shortest period of inspection time are indicated considering drum as one unit in the table 3. But details of individual joints are indicated in the figure 2. For example, IMG (square 7) was carried out on one seam weld and therefore is indicated in one square while other squares (seventh) are represented by black squares, where IMG was not carried out. It is also shown by Greek alphabets 'γ' as % expected remaining life (with positive sign).

In conventional method of presentation (tables) these information cannot be presented in concise manner (form) compared with the present method.

CONCLUSION:

NDT methods used, results obtained, the course of action to be taken and balance life available are presented in a new format which has been received and appreciated by the industry.



**FIG 1 PREVIOUS YEARS AND CURRENT YEAR NDE TESTS, ACCEPTANCE, ACTION PLAN
REMAINING LIFE LEGEND ON THE COMPONENTS**

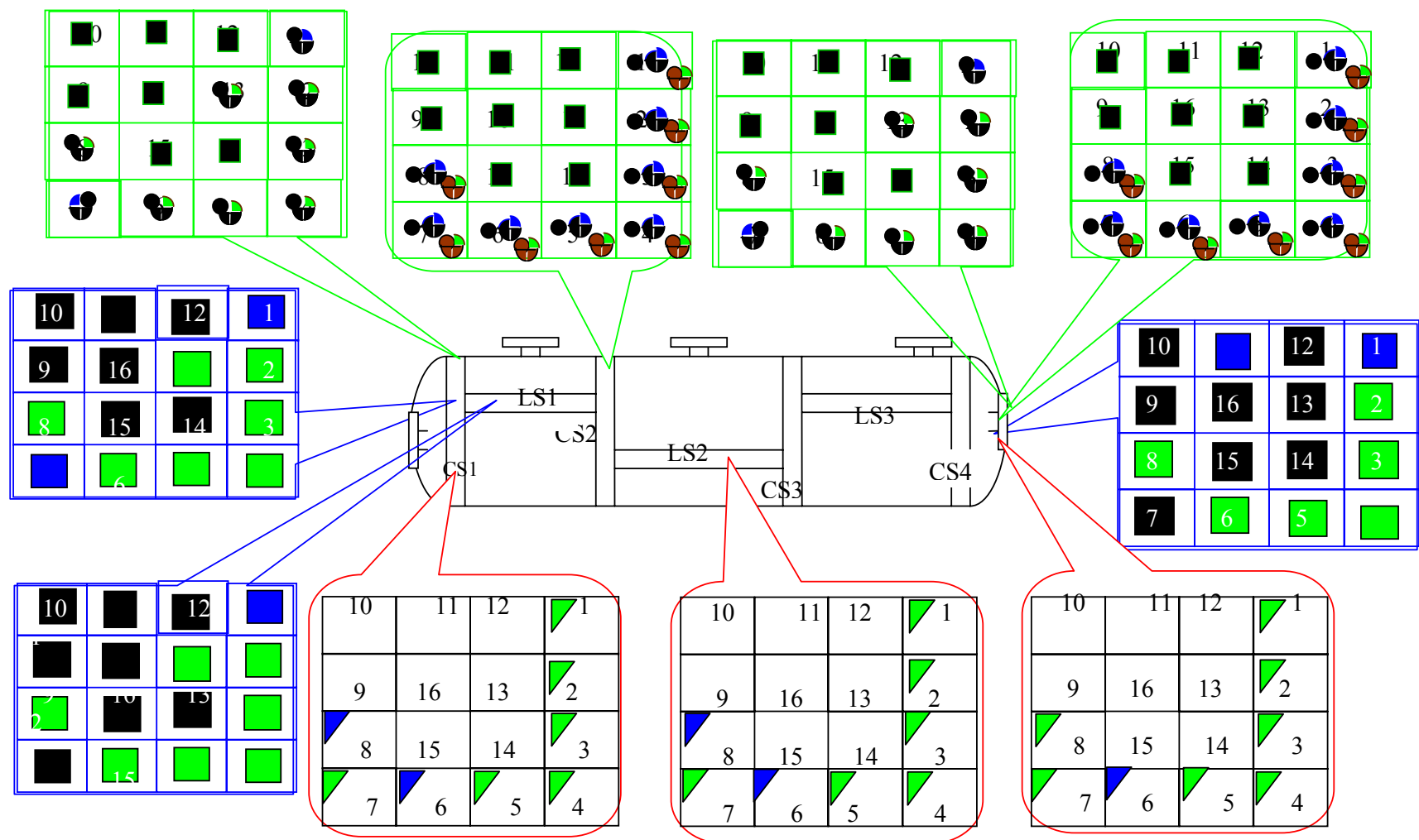


TABLE 1: SCOPE OF THE WORK

S.No	Boiler Pressure Parts	V T	DIM	MT	PT	UF D	UT G	IM G	HB	HD	DA	FO B	OS M	IC A	AC R/MA
1	STEAM DRUM	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-

TABLE 2: A NOVAL METHOD OF PRESENTATION

S. No	Boiler Pressure Parts	V T 1	DIM 2	M T 3	PT 4	UF D 5	UTG 6	IMG 7	HB 8	HD 9	DA 10	FO B 11	OS M 12	ICA 13	AC R/MA 14
1	STEAM DRUM														