**Literature Review**

**Weld Defects Classification and CSA Z662.11**

The Canadian Standards Association Code of Practice CSA Z662.11 classifies possible weld defects as surface breaking and buried (Figure 1). Surface breaking defects are those resembling a crack that is connected to the surface of the pipe wall, whereas buried defects are those that are not connected to the surface of the pipe wall. Although the surface breaking defect is depicted in Figure 1 on the inner surface of the pipe wall, the CSA code doesn’t distinguish between surface flaws on the inner surface and those on the outer surface. According to Z662.11, in the absence of experimental data, the critical tensile strain of the pipe material () can be calculated based on equation (1) and equation (2) corresponding to the crack types depicted on the left and right side of Figure 1 respectively.

|  |  |
| --- | --- |
| surface defect | buried defect |

Figure 1: Classification of weld defects according to CSA Z662.11 as surface breaking (left) and buried (right)

|  |  |  |
| --- | --- | --- |
|  | | (1) |
|  | | (2) |
|  |
|  |

Eq. (1) and eq. (2) are developed based on the extensive experimental work conducted by Wang et al

**References**

[1] Wang Y.Y., Chen Y. (2005), “Reliability Based Strain Design. Gas Research Institute Report 04/0146”, Des Plaines, IL.

[2] Wang Y.Y., Cheng W. (2004),”Guidelines on Tensile Strain Limits. Gas Research Institute Report 04/0030”, Des Plaines, IL.

[3] Wang Y.Y., Cheng W., Horsley D. (2004),”Tensile Strain Limits of Buried Defects in Pipeline Girth Welds ”, Proceedings of the International Pipeline Conference, Calgary, Alberta

[4] Wang Y.Y. et al (2004), “Tensile Strain Limits of Girth Welds with Surface-Breaking Defects Part I – An Analytical Framework”, Proceedings of the 4th International Conference on Pipeline Technology, 235-249.

[5] Wang Y.Y. et al (2004), “Tensile Strain Limits of Girth Welds with Surface-Breaking Defects Part II – Experimental Correlation and Validation”, Proceedings of the 4th International Conference on Pipeline Technology, 251-266.