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where Ï4 is the bi-Laplacian operator, w is the deflection,
D is the flexural rigidity given by D=(Eh 3

$$\nabla^4 w = -\frac{\lambda}{D}\left(\bar{N}_x \frac{\partial^2 w}{\partial x^2} - 2\bar{N}_{xy}\frac{\partial^2 w}{\partial x \partial y} + \bar{N}_y \frac{\partial^2 w}{\partial y^2}\right) \quad (2)$$

T[redacted]ide ed[redacted] m[redacted]del and i[redacted] t[redacted]e width ar[redacted] dinate syste[redacted] and y in the[redacted]

There are v[redacted] distribution [redacted] direction. Fi[redacted] polynomial [redacted] 8-13 the W-[redacted] input residu[redacted] part). The r[redacted] compressio[redacted]

Simulations[redacted] The most in[redacted] sis is the 1[redacted] connected t[redacted] centre buck[redacted] between the[redacted]

As stated in[redacted] exhibits eig[redacted] In principle[redacted] will follow t[redacted] being the lo[redacted]

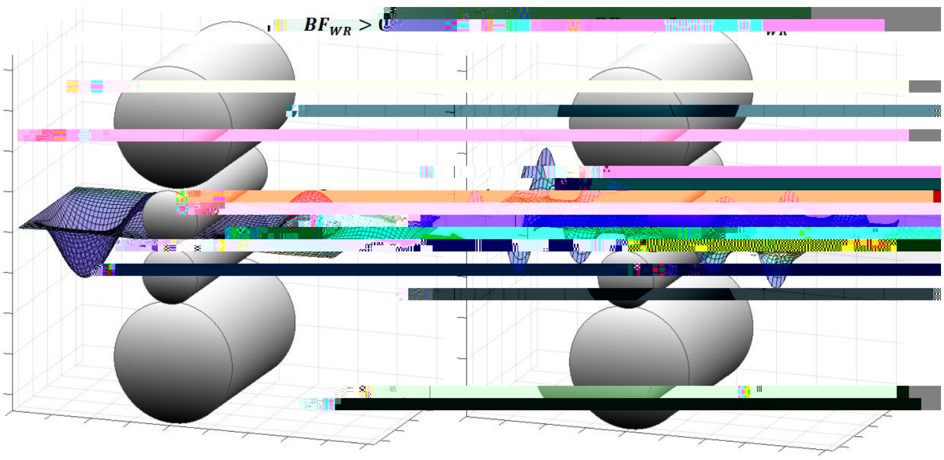

Fig.3 - 3-D visualisation of the roll stack with manifest strip shape (blue = compression, yellow= tension). The deformation of the roll stack is not visible in the graph.

CONCLUSIONS

The presented model combines roll stack deflection and buckling analysis to predict latent and manifest shape errors during rolling. It links the most common process parameters directly with the buckling analysis results, providing an intuitive simulation tool. The elastic buckling validation shows that errors are below 3.3% and 2.8% for the critical loads and wavelengths, respectively. The application section demonstrates that the buckling model is capable of predicting both critical buckling limit and modes that are characteristic for rolling.

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