# Article information:

On the correlation between residual stresses and global indentation quantities: Numerical results for general biaxial stress fields - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0261306912000416>

# Article summary:

1. Sharp indentation testing can be used to measure residual stresses and strains in a material.

2. Previous studies have shown that residual stresses have a small influence on the observed Vickers indentation hardness, but can affect the amount of piling-up of material at the contact contour.

3. A complete theory for general (non-equi-biaxial) stress fields is still lacking, but efforts are being made towards a qualitative description of this feature.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article titled "On the correlation between residual stresses and global indentation quantities: Numerical results for general biaxial stress fields" provides a comprehensive overview of the research conducted on the influence of residual stresses and strains on sharp indentation testing. The article highlights various experimental techniques used to determine residual stresses and strains in materials, including indentation crack techniques, fracture-surface analysis, neutron and X-ray tilt techniques, beam bending, hole drilling, and layer removal.

The article then focuses on the use of sharp indentation testing as an alternative method for measuring residual stresses/plastic strains at the nano-, micro- or macro-level. The authors provide a detailed account of previous investigations into the problem and how much knowledge has been gained over time. They also discuss how some attempts have been made to develop a complete theory for general (non-equi-biaxial) stress fields but that a full understanding is still lacking.

While the article provides valuable insights into the mechanics of indentation of residually stressed materials and structures, it does have some potential biases. For example, it primarily focuses on sharp indentation testing as an alternative method for measuring residual stresses/plastic strains without exploring other possible methods in detail. Additionally, while it discusses various investigations into the problem by different researchers, it does not provide a balanced view of all perspectives or counterarguments.

Furthermore, while the authors mention that some studies suggest that spherical indentation is an attractive approach for residual stress determination due to its sensitivity to residual stresses in comparison to sharp indentation testing, they do not explore this possibility further or discuss any potential drawbacks associated with this method.

Overall, while the article provides valuable insights into the mechanics of indentation of residually stressed materials and structures, readers should be aware of its potential biases and limitations.

# Topics for further research:

* Alternative methods for measuring residual stresses in materials
* Spherical indentation for residual stress determination
* Limitations of sharp indentation testing for residual stress measurement
* Theoretical models for residual stress determination in non-equi-biaxial stress fields
* Comparison of different experimental techniques for residual stress measurement
* Applications of residual stress measurement in engineering and materials science.

# Report location:

<https://www.fullpicture.app/item/df98d428d1f710709d4b81607ebea716>