# Article information:

A new method for estimating residual stresses by instrumented sharp indentation - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S1359645498002262>

# Article summary:

1. The estimation of residual stresses is important in various engineering applications, and current methods have limitations in terms of accuracy, applicability, and scalability.

2. Instrumented indentation offers potential advantages for probing residual stresses, including the ability to extract local and volume-averaged properties and flexibility in measuring different size scales.

3. This article presents a simple methodology for estimating surface residual stresses in elastoplastic solids using sharp indentation, which can be used with commercially available equipment and provides quick estimates of residual stresses.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article titled "A new method for estimating residual stresses by instrumented sharp indentation" provides an overview of the current methods available for estimating residual stresses in engineering applications and proposes a new methodology using instrumented indentation. While the proposed method has potential advantages, such as flexibility in measuring local and volume-averaged residual stresses, the article lacks a critical analysis of its limitations and potential biases.

One potential bias is the focus on the advantages of instrumented indentation without acknowledging its limitations. The article mentions that traditional methods such as X-ray diffraction or neutron diffraction have problems with measurement accuracy, spatial resolution, and applicability to a broad range of materials and geometries. However, it does not provide evidence to support these claims or acknowledge that instrumented indentation also has limitations in terms of accuracy and applicability.

Another potential bias is the assumption that prior mechanical or thermal loading results in an equal-biaxial state of residual stress at the surface. This assumption may not hold true for all engineering applications, and there may be other factors that contribute to residual stresses that are not considered in this methodology.

The article also lacks a discussion of potential counterarguments or alternative methods for estimating residual stresses. For example, while it acknowledges that X-ray diffraction is a traditional method for measuring residual stresses, it does not discuss recent advancements in X-ray diffraction techniques or other emerging technologies.

Furthermore, the article includes promotional content by mentioning a recent US Patent application related to instrumented indentation without providing any critical analysis of its implications or limitations.

Overall, while the proposed methodology has potential advantages, the article would benefit from a more critical analysis of its limitations and potential biases. It should also consider alternative methods for estimating residual stresses and acknowledge their strengths and weaknesses.

# Topics for further research:

* Recent advancements in X-ray diffraction techniques for measuring residual stresses
* Limitations of instrumented indentation for measuring residual stresses
* Factors contributing to residual stresses in engineering applications beyond mechanical or thermal loading
* Alternative methods for measuring residual stresses in engineering applications
* Criticisms of the proposed methodology for estimating residual stresses using instrumented indentation
* Comparison of the proposed methodology with other emerging technologies for measuring residual stresses.

# Report location:

<https://www.fullpicture.app/item/cd8f61e07fab9dc51ee39e68ee479308>