An examination on use of the quarter point elements for the accurate determination of notch stress intensity factors – CRG, DST

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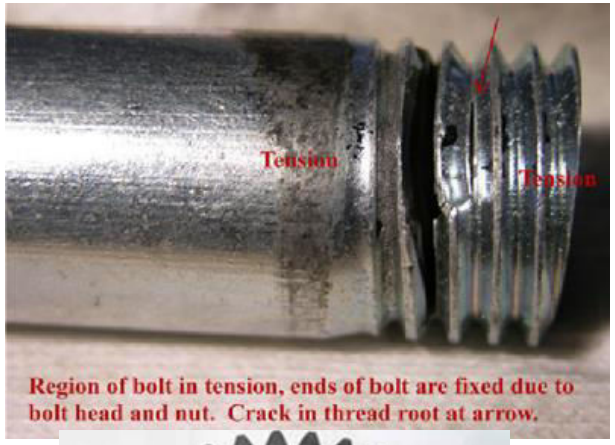
❖ Theme

To develop for the first time, a finite element based technique for the accurate estimation of the NSIFs in sharp V-notched configurations under mode I and mixed mode (I/II) loading conditions with quarter point elements (QPEs) at the notch tip.

❖ Deliverables

1. The outcome make QPEs in all commercial Software or in-house codes to use with sharp V-notched engineering bodies.
2. Useful to the scientists working in DRDO, CSIR labs, ISRO and other defense related institutions in prediction life of critical engineering components.
3. Extremely useful in the development of computationally inexpensive techniques



Region of bolt in tension, ends of bolt are fixed due to bolt head and nut. Crack in thread root at arrow.

❖ Highlights (Societal impact)

1. For the very first time an attempt will be made to use quarter point elements to sharp-V notched bodies for computation of NSIFs accurately
2. Extremely useful in life estimation of engineering components using commercial software or in-house codes.
3. Extremely useful in analysis of gears, screws, threaded fasteners and other V-notched engineering components

❖ Current status of work being done

1. With the work that is being done so far, it is demonstrated successfully that the quarter point elements can be used to find NSIFs of sharp-V notched engineering components.
2. Work is under process to show further evidence to demonstrate the above use of the quarter point elements.