



Dr. Carpenter is a metallurgical engineer specializing in analysis of fractures, corrosion failures, and weld failures. He has conducted failure analysis of numerous structural and mechanical devices. Dr. Carpenter has also been responsible for the evaluation of failed components from automobiles, aircraft, gas and water systems, and bearing assemblies. He has taught a course on x-ray diffraction and x-ray fluorescence.



**BERNIE CARPENTER. PHD**

## LICENSURE & EDUCATION

Ph.D. Metallurgy, Colorado School of Mines, "*Phase Stability of Fe-Al-Cr-Ni Weld Metals*", 1988  
B.S. Engineering Metallurgy, Colorado School of Mines, 1982

### Practice Areas

Metallurgical Engineering  
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## WORK HISTORY

Metallurgical Consultant, *Western Engineering & Research Corporation*, 1997 to present  
Metallurgical Consultant, *Analytical Engineering, Inc.*, 1994 to 1997  
Staff Engineer, *Lockheed-Martin*, 1989 to present  
Project Manager, *Kevex Instruments*, 1988 to 1989

## METALLURGICAL EVALUATION

Dr. Carpenter has conducted research in the welding of ferrous and nonferrous materials. His experience includes joint design, filler metal selection and parameter specification for joining processes. His metallurgy experience provides a strong background for assessing weld metal defects and failures. Dr. Carpenter has worked extensively with the evaluation of plumbing component fractures and corrosion failures. He has also evaluated fire effects on steel structures. Other joining specialties include brazing and soldering using torch or vacuum furnace techniques. Dr. Carpenter has performed extensive mechanical testing to characterize material suitability for specific applications.

Testing experience includes proof loading, fatigue testing, ultimate and yield strength determination. Other analytic specialties include hardness testing of materials as well as transmission (TEM) and scanning electron microscopy (SEM), x-ray photoelectron spectroscopy (XPS) and x-ray diffraction (XRD). Extensive analysis and design experience allows him to evaluate failed components in terms of in service loading.

## PUBLICATIONS AND PATENTS

Dr. Carpenter has written several articles and technical papers on metallurgical topics. He has two patent applications pending.

## AFFILIATIONS

*American Society of Materials*  
*The Metallurgical Society*  
*American Institute of Mechanical Engineers*  
*American Welding Society*  
*International Metallographic Society*  
*National Association of Corrosion Engineers*  
*Sigma Xi*