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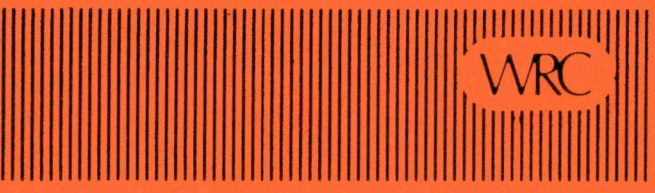

Welding Research Council
bulletin

GUIDANCE ON THE APPLICATION OF CODE CASE 2211—OVERPRESSURE PROTECTION BY SYSTEMS DESIGN

J. R. Sims
W. G. Yeich

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These Bulletins contain final Reports from projects sponsored by the Welding Research Council, important papers presented before engineering societies and other reports of current interest.

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FOREWORD

To protect pressure vessels from the potential for pressures in excess of values used in the design process, industries and ASME Code rules have traditionally used pressure relief devices. The device is installed at an effective location in the pressurized vessel system and is designed to open when the vessel pressure exceeds the relief pressure specified for the device. This overpressure design feature provides dependable protection for many vessels and systems. For vessels operating with hostile or corrosive fluids and environments, the pressure relief device may, over time, plug the inlet or outlet thereby causing the pressure relief device to be inoperative. To address this issue, alternatives to pressure relief devices were sought.

Starting with Code Case 2211 in mid 1996 and Code Case 2211-1 three years later, ASME approved an acceptable alternative for Section VIII, Division 1 and 2 pressure vessels. This alternative to pressure relief devices uses the concept of overpressure protection by system design. In the implementation phase of the approved alternative, it was soon found that additional guidelines were needed to properly and more uniformly apply the technical requirements specified in the code case.

At the request of Mr. Guido Karcher and ASME in late 1998, PVRC prepared a Request for Quote, evaluated potential investigators and initiated a development activity in mid 2000. The PVRC development activity culminated in this report which provides detailed guidelines for the owners, users and regulators in the implementation of Code Case 2211-1. More specifically, this report provides guidelines for conducting a detailed, organized, systematic multidisciplinary analysis to ensure that the maximum allowable working pressure of the vessel is greater than the highest pressure that can reasonably be expected from all credible operating and upset conditions. Illustrative examples are included. These examples are typical of those employed in petroleum refining, chemical, pulp and paper industries and other similar process plants.

On behalf of the PVRC Committee on Dynamic Analysis and Testing (DAT), I commend all participants for their dedicated roles in the identification and execution of this PVRC activity. Specifically, a special thanks is extended to Mr. Guido Karcher for his liaison with our ASME sponsor during the initiation phase and his role as technical mentor throughout the project.

Our thanks are also extended to our ASME sponsors for the opportunity to provide technical oversight to this first-of-a-kind set of guidelines. The authors, Messrs. J.R. Sims and W.G Yeich are recognized for their development of these effective guidelines, procedures and illustrative examples and their patience demonstrated during the comment resolution phase of the project. Finally, our appreciation to DAT Co[illegible] Dr. R.J.