ISSN 1084-3744

SAFETY ABSTRACT

May 1997 Volume 2, No. 3

Triodyne Inc.

Consulting Engineers & Scientists – Safety Philosophy & Technology

5950 West Touhy Avenue Niles, IL 60714-4610 (847) 677-4730

FAX: (847) 647-2047

e-mail: infoserv@triodyne.com

GENERAL SAFETY

Infant Crib Failure Analysis

by Dennis B. Brickman, P.E.[1] and Ralph L. Barnett[2]

ABSTRACT

In response to infant crib accident data collected by the Consumer Products Safety Commission, a new standard, ASTM F1169-88, was developed by the Juvenile Products Manufacturing Association and approved by the American Society for Testing and Materials to establish test requirements to address failures associated with mattress support hardware, glued or bolted connections, dropside latches, and dislodging of teething rails. This standard also addresses instructional literature that must accompany cribs.

The ASTM test requirements for the crib stationary side rail describe a go/no-go program which gives information on the total behavior of the system, but provides no information about the weak links. In addition, the ASTM go/no-go criteria provide no quantitative information regarding the level by which a particular crib design exceeds the specified performance requirements. An accelerated loading program, executed through shake table testing, facilitates an ordering of weak links in the system. According to the strongest link principle, *the challenged design feature cannot be a proximate cause of the subject crib failure if it is preceded by weak link failures not present on the artifact.* Furthermore, the random vibration method produced by the shake table testing reveals subtle differences among fasteners and distinguishes between proper and improper installation states such as the vertical orientation of a screw head. Because of available symmetry, comparisons can be made between hardware on the left and right sides of the stationary side rail, making it very clear which is better in a random vibration load environment.

[1] Senior Mechanical Engineer, Triodyne Inc., Niles, IL.

[2] Professor, Mechanical and Aerospace Engineering, Illinois Institute of Technology, Chicago, and Chairman of the Board, Triodyne Inc., Niles, IL.

The full text of this paper was published at the 51st Meeting of the Society for Machinery Failure Prevention Technology and the 12th Biennial Conference on Reliability, Stress Analysis and Failure Prevention in April of 1997 and is available from Triodyne Inc. at no cost. To request this paper, call (847) 677-4730 ext. 162.

ASME-TRIODYNE SAFETY AWARD

ASME-Triodyne Safety Award presented by Triodyne president, S. Carl Uzgiris, to 1997 winner, George Libertiny.

Engineers usually receive awards for innovations in function, speed, weight, materials, and cost but not in safety. But safety, rather the lack of it, is what gets engineers in trouble. That is why in 1991 Triodyne, through the American Society of Mechanical Engineers (ASME), initiated the ASME-Triodyne Safety Award to honor engineers who have distinguished themselves in education and research in the safety aspects of mechanical design. Award recipients are chosen by the Design Division of ASME (with no input or interference from Triodyne!).

The design division recently announced that the 1997 recipient of the ASME-Triodyne Safety Award is George Z. Libertiny, Principal Consultant at Design and Manufacturing Defect Consultants (DMDC), a design and safety engineering consulting firm he founded in 1964, and a full Professor of Mechanical Engineering on the adjunct faculty of the University of Michigan-Dearborn.

Dr. Libertiny received his BS in Mechanical Engineering with honors from the University of Strathclyde, Glasgow, Scotland in 1959, and was awarded his Ph.D. in Mechanical Engineering from the University of Bristol, England in 1964. He received two Ford Foundation Scholarships to complete his studies. Dr. Libertiny has been on the faculty of the University of Miami, and the Illinois Institute of Technology, and was a Principal Research Engineer for Ford Motor Company in their Advanced Methods Department and their Automotive Safety Office. He holds a U.S. Patent and has received two awards from the Society of Automotive Engineers (SAE), the R.R. Teetor Award and the Forest R. McFarland Award. Dr. Libertiny is a Fellow of ASME, a member of SAE, the Society of Experimental Stress Analysis, and Sigma Xi.

The 1996 recipient of the ASME-Triodyne Safety Award was Jerome Lederer, founder and president emeritus of the Flight Safety Foundation. In his long and distinguished career, Mr. Lederer served Franklin Roosevelt as the first director of the Safety Bureau of the Civil Aeronautics Board and Lyndon Johnson as Director of the Office of Manned Space Flight Safety for the Apollo program. He founded the Flight Safety Foundation in 1947 and served as its director for 20 years while also serving as Director of the Cornell-Guggenheim Aviation Center.

Mr. Lederer received his BSE in Mechanical Engineering from New York University in 1924 and his ME from the same school a year later. His other awards include the NASA Exceptional Service Medal, the NASA Group Achievement Award, the Ziolkowsky and Gagarin Award from the Soviet Federation of Cosmonauts, the FAA Distinguished Service Medal, the Wright Brothers Memorial Award, the Von Baumhauer Medal of the Royal Dutch Aeronautical Society and he was inducted into the Safety and Health Hall of Fame in 1989.

Triodyne is honored to have its name associated with such exceptional men and we congratulate them along with past award recipients Professor John Grimaldi, Professor Charles Smith, and Professor Thomas Talbot.