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stairs & ramp safety

WATCH & YOUR STEP HOLD ON

A STORY IN STAIR & RAMP SAFETY
By Alvin Ubell & Lawrence Ubell

Stairs date back tens of thousands of years. The first humans were motivated to climb to higher elevations to find food and shelter and to escape from predators...or, perhaps, just plain curiosity. Then they got creative. Very early on, they started carving indentations, or rudimentary steps, into the sides of mountains. Some footpaths and steppingstones date back more than ten thousand years. Around five thousand years ago, Egyptian architects started to formalize stair design to make the climb more comfortable. The real breakthrough came with the Romans who dramatically improved stair technology about 100 BCE. Marcus Vitruvius Pollio, an architect in the service of Julius Caesar, used geometry and applied the Greek mathematician Pythagoras' theorem ($a^2 + b^2 = c^2$) to develop what may be the world's first stair design formula. Using Pythagoras' theorem to calibrate his designs and by standardizing the proportions of the treads and risers in relation to measurements to the ideal human body, Vitruvius made stairs safer and more comfortable and brought to the world the first formal study of ergonomics. Over the years, stairs didn't just become a necessity; they came to be associated with affluence and power. It's rare to find a palatial home without a stair centerpiece. In "Fiddler on the Roof", the musical adaptation of a Sholem Aleichem story, Tevya the milkman dreams of being rich and "having a house with one long staircase just going up and one even longer coming down... and one that's going nowhere just for show". Many of the world's important public buildings use stairs as a primary architectural feature. Think of the Capitol Building in Washington, D.C., or the Metropolitan Museum of Art in New York City. Stairs are ancient, necessary, commonplace and wellrespected. But that's not the entire story. Think about it: climbing is a physical endeavor working against gravity. Not to misquote Sir Isaac Newton, but what goes up, must come down and sometimes with a thud or broken bones or worse! Stairs can be one of the most dangerous components in a building or home.

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Watch Your Step
& Hold On!





The National SAFETY COUNCIL

reports 12,000 stair deaths per year, with half of these deaths occurring in the home. This makes accidents from stairs second only to automobile accidents as the major cause of unintended injuries in the United States. The actual number is probably much larger. We believe most stair incidents are not reported because many people who get injured don't know how or why they fell. They might think they slipped, tripped or stepped on something (like an untied shoe lace), perhaps lost their balance on wobbly high heels or any number of other reasons. In any case, they don't blame the stairs.

Then there are those who are too embarrassed to tell anyone they fell. They think it's their own fault, when, in fact, it may be the fault of the stairs. Sometimes the person is unconscious or worse, so no record is produced of what happened. There is usually no investigation that follows stair incidents, and if there is, the investigator assigned does not always have the technical expertise or knowhow in stair design and construction to perform an adequate evaluation.

There is no question that if a stair or ramp is designed and built by a skilled craftsperson and maintained in a manner consistent with all the rules, regulations and standards that took hundreds of years to develop, here is still the possibility of an accident. If someone doesn't watch his or her step and/or doesn't hold onto the banister, no one can fault the stair.

In fact, stairs can actually help you not be a klutz. Think of a staircase as a cograil and the user as a cogwheel. In other words, the handrail should be the guide for the person walking on it and the stair is the cograil. When a cograil, cogwheel and the guiding mechanism are designed with an acceptable tolerance and well maintained, to run smoothly. If there is any defect, however, no matter how slight a lack of maintenance or a broken part the system will fail.

So here we are in the 21st century with all kinds of sophisticated devices, gadgets, toys and appliances, developed within the last hundred years or more. We can land a man on the Moon and a probe on Mars and we can't get stairs to work properly and safely. **WHY?**



IS IT **THE LACK OF KNOWLEDGE OR "KNOW-HOW"** **BECAUSE PEOPLE WHO GET INJURED OR DIE DON'T MATTER** **THAT MONEY IS MORE IMPORTANT THAN PEOPLE** **THAT IT'S NOT EXCITING**

We believe it is all of the above (and maybe some additional reasons we haven't thought of yet).

The problem is that most stair incidents usually happen one at a time

and are not considered newsworthy. And when a major stair or ramp incident does occur, it is hidden by the event that triggered the catastrophe. For example, in 1903, in the Iroquois



A WORD ABOUT CAUTIONARY SIGNAGE

Theatre in Chicago, 500 people died. They were found piled 8 feet deep, crushed in a stampede that started because of a fire that didn't even burn down the theatre. The real reason for the deaths was that the stairs and exit ramps were designed incorrectly. But what got the headlines? The culprit was the stairs, but the papers said "FIRE!"

Again, in 1942 at The Coconut Grove in Boston, 700 people attempting to escape a fire died because of poor stair and exit design. The headlines should've read "**Stairs and Exits Kill 700**", but again, they didn't.

And most recently, in New York City on September 11, 2001, in the World Trade Center's Twin Towers, 2,792 people lost their lives, and 2,261 were injured. Yet again, many of the dead and injured victims of the dastardly terrorist attack were also hurt or died as a consequence of poor and inadequate stair and exit design.

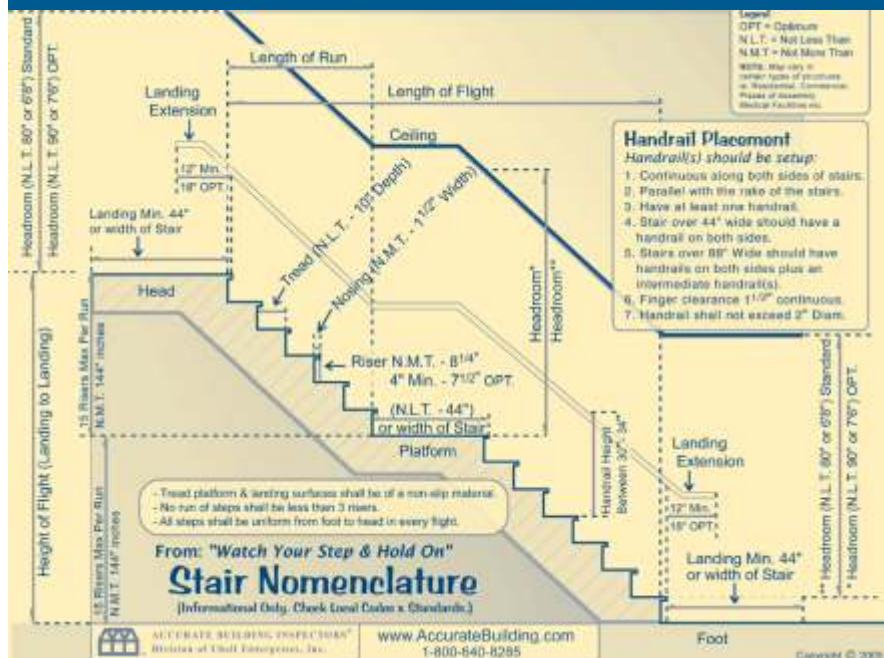
If 9/11 teaches us nothing else, the time has come to do whatever is necessary to achieve the best stair and safety design, effort and talent money can buy, so that if another vicious terrorist attack occurs, inadequate stair and exit design should not unnecessarily increase injuries or demise.

It's unthinkable to suggest that some code reforms should be made lenient on stair tolerances. Isn't it simply more sensible and more important to build and maintain stairs that comply with strict, effective safety standards than to just save money and create unnecessary injury, pain and suffering? And, considering that almost 50% of stair accidents happen in the home shouldn't the criteria for stairs built in residential structures be just as strict as elsewhere? The psychomotor function is a complex series of mental and physical events that makes repetitive activity possible. The psychomotor, the ability and agility of a person using a stair, does not change when they are at home, school, workplace or at play. Therefore, the safety, design and installation standards should not vary where life and limb may be at issue. Stair manufacturers, code enforcement agencies, insurance carriers /agencies, architects, engineers, and safety experts should together seek to convince builders and developers that it is in their own self interest to make needed changes that could potentially save lives.

For example, there's something called soft stair technology. I.e. the elements of the stair may be made of impact-absorbing materials to reduce impact injury. That and other technologies exist that could make stairs fireproof, strong, safe, wear resistant, beautiful and soft. Lives can be saved, injuries reduced and at the same time save money. More importantly...it's the right thing to do!



These signs may look like an effort to protect you, but in fact, realize that these cautionary signs are excuses not to correct or repair the defective condition on the stair or ramp. One should also understand that placing a warning sign could be an admission of knowledge of the defect prior to the date of an incident. This could also mean the person who put up the signage actually knew of the existence of the defect (in law: notice or constructive notice) or it could be considered constructive notice which is when the defect is so obvious that any one could have recognized the condition. There are other concerns regarding cautionary signs. For example, the posting of a sign indicating a dangerous condition does not necessarily mean that everyone who sees it can read it. A language barrier can lead to a major injury. The question arises: Is the warning sign more or less costly than the corrective measures required to repair the defect?



ACKNOWLEDGMENTS

Our discussion here was inspired by the reading of two books: “The Staircase: History and Theories” and “The Staircase: Studies of Hazards, Falls, and Safety Design,” both by Prof. John Templer. They are serious and insightful studies of the history, inherent conditions and dangers of stairs and their importance to people. We would also like to thank him for introducing us to Mr. Marcus Vitruvius Pollio, the inventor of the first stair design formula.

We believe that our vast hands-on experience together with all the data that Prof. Templer documented could be part of an ad hoc movement to insist on the need for improved stair and ramp safety design and standards. We would also like to thank those who wrote the volumes of the New York City's Building Code, 1916, 1938, 1968, and the soon to be released revision. We truly hope they read Prof. Templer's books before making a judgment on loosening the tolerances and standards. Saving money, time and convenience is not an acceptable defense. Cost should not be the ultimate governing factor if the result is poor or compromised stair design which leads to more death and injury. We would also like to thank the good work of:

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See: Stair Design Glossary & Investigators' Check-Off List Top 21 Safety Hazards in Stair & Ramp Installation

www.AccurateBuilding.com/services/legal/papers/stair_ramp_safety.html

ABOUT THE AUTHORS

ALVIN UBELL

Alvin Ubell created the firm of the Accurate Building Inspection in 1961 and has testified in city, state and federal courts on an assortment of construction matters and many stair related incidents. He has investigated more than 280 stair related occurrences for both defendants and plaintiffs and has testified more than seventy times on stair conditions. He is a qualified Building and Home Inspector and has licensure in the states of New Jersey, Connecticut, and Massachusetts and is also a charter member of the American Society of Home Inspectors (ASHI).

He has been in the construction industry for over 50 years. He was a cabinetmaker, stair builder, designer, and student of architecture at Pratt Institute in Brooklyn, New York. In 1961 he founded the firm of Accurate Building Inspectors (ABI). ABI now serves nearly 3,500 law firms and many architectural and engineering firms. He was the recipient of an award from the U.S. Consumer Products Safety Commission for his work on safety in the home and the workplace. During his tenure he has, on a day-to-day basis, inspected, evaluated, critiqued and reported on tens of thousands of stairs sets and their safety conditions. A regular on “The Leonard Lopate Show” on WNYC Radio, in New York City, he and his son, Lawrence, discuss matters pertaining to building construction, stair safety, energy conservation, home safety and better living within your environment.

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During his tenure with the firm of ABI, he has, on day-to-day basis, inspected, evaluated, critiqued and reported on thousands of sets of stairs and their safety conditions. A regular on “The Leonard Lopate Show” on WNYC Radio in New York City, he and his father discuss matters pertaining to building construction, stair safety, energy conservation, home safety and better living within your environment.