

Automobile Tires and Go-Kart Barriers

By Peter F. Olesen, P.E.

Since 1990, our firm has designed more than 150 existing concession go-kart tracks throughout the United States (currently 30 states) and Canada. The utilization of used automobile tires in conjunction with a vertical steel barrier rail and a barrier curb backing have been the safety barrier of choice on all but one.

This system absorbs kart impacts against the rails by permitting potential compression of over twenty inches, horizontally. It eliminates the sudden impact of striking a rigid barrier, greatly reducing the "G" forces transmitted to the drivers and the karts themselves. The controlled compression and pressure to return to the tires original shape redirects most of the karts striking the rail back onto the track in the direction they were traveling.

To-date this writer, a professional engineer in Illinois and other states has continued to design track safety barriers using automobile tires as the energy attenuator in the barrier system because of their ability to take continual compression on kart impact and directing the barrier rail back to its original alignment.

To date there have been literally hundreds of attempts to create a superior and safer system than a properly designed Barrier Rail/Automobile Tire/Barrier Curb combination. None have proven to be the equal, in this writer's professional opinion. Guest and staff safety must always be the determining factor.

Beginning with our original track designs we developed a drain hole system to be drilled in the tire sidewall making contact with the pavement surface to eliminate water being retained in the tires after rainfall. The primary reason for the design was to eliminate the potential for mosquitoes breeding in standing water inside the tires.

As the tires are bolted to the back face of the barrier rail and on the opposite side to the barrier curb, this requires drilling holes through the tire tread, 180 degrees apart. At the same time we call for one inch minimum diameter drain holes to be drilled in the tire sidewall that will be facing the pavement surface. These will be drilled along the same alignment as the bolt holes down facing sidewall along the same line as the holes, one next to the hole for the bolt from the tire and one from the bolt connecting to the curb. We also call for two additional holes at right angles to the first two. This four hole pattern provides drain holes at the low points regardless of the cross slope or profile grade, whether the track cross section slopes up or down, and whether the track profile is up or down.

At such time as individual tires may be degraded by UV and weather conditions, maintenance programs will replace them with new units and the replaced tires recycled in the same manner as they would have been had they not have been used for the barrier system. It is an environmentally responsible use of an existing material. By using the drainage hole system described we are also being environmentally responsible by preventing water accumulation in the tire casings.

This system combines the extended useful life of the tires for many years with the creation of what has proven throughout the industry to be what we feel is still the safest track barrier system. Other designers and track builders have used various systems for backing the tires. Some have slashed the casings on the downward face rather than drilling the holes. Each of these methods

work, but we feel they don't provide the same degree or uniformity of energy absorption. As long as the slashes or cuts are at the low points of the tire, they should drain.

We will continue to utilize used tire casings as long as they are available, unless somewhere in the future a superior (safer) replacement design is developed.

Peter is a Licensed Professional Engineer in the States of Illinois, Michigan and North Carolina and is President of Entertainment Concepts, Inc. (formerly Peter F. Olesen and Associates, Inc.). He founded the firm in 1984 and expanded its range of consulting services over the years to now provide a wide range of consulting services. Services range from preliminary site evaluations, feasibility studies, business plan assistance, concept development, master planning, design and construction engineering services that apply to new facilities as well as renovation or expansion of existing facilities. Projects include the design of both outdoor and indoor, family entertainment centers, amusement parks, theme parks, stand-alone go-kart tracks and miniature golf courses, bumper boat ponds and related attractions. The firm has been and continues to be at the forefront of go-kart, miniature golf course and bumper boat pond design, introducing many innovations in safety, geometrics, design and construction methods now widely emulated throughout the industry.

To date the firm has completed more than 700 projects spanning 46 states, Angola, Brunei, Canada (Alberta, British Columbia, Ontario, Quebec and Saskatchewan), Cuba (Guantanamo Bay), Kazakhstan, Mexico, Puerto Rico, Saudi Arabia and Vietnam. Since 1987 Mr. Olesen has exhibited at more than 100 industry trade shows. He participated as a member of the faculty of Foundations Entertainment University (49 seminar presentations over 17 years), presented more than 100 seminar presentations at the International Association of Amusement Parks and Attractions, FunExpo, Kart Expo and Leisure Expo, as well presenting go-kart safety seminars for the State of Ohio. He has, and continues to author articles for industry magazines and internet newsletters. For additional information on projects and services offered please refer to our web page www.fecdesigners.com or contact us at 847-561-7013 or www.peteolesen@yahoo.com.

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