

Chapter 4

FAILURES in the RACING PACKAGE



FIG. 4.1 Definitely NOT Failures are these Serious Contenders in the 4 – 8 Year Old Class of KARTING at Charlotte County Speedway (Punta Gorda, FL), May 20 , 2007

All racers, whether aged 5 or 55, want to have a “Safe Ride”. A safe ride implies reducing various *failures* of their racing package. This means improving both the INs of internal safety (hardware) and the OUTs of external safety (personnel, etc.). Personnel “failures” will be considered in various chapters dealing with the OUTs in the follow up book. The current chapter deals with improving the INs and introduces terminology and concepts needed to discuss equipment failures. Four technical laps (sections are called “tech-laps”) are required in order to understand equipment failures: 1. *Basic Material Stuff*, 2. *Elastic Stuff*, 3. *Partially Elastic Stuff*, and 4. *Ways to Get/Avoid a Mechanical DNF* (Did Not Finish). All racers should peruse the first lap which deals with basic terminology and concepts. Many racers will benefit from the second tech-lap which studies the basic tool for representing material behavior. Some racers will find that the third tech-lap clears up some misconceptions. All racers will benefit from the last section that itemizes six ways that a mechanical part can “fail”. This is a long tech-lap, but it introduces terminology and key physical properties and concepts to prevent “mechanical failure” of your racing package.

Section Details

1. Basic Material Stuff:

Contact Stress, Internal Stress, Normal Stress, Shear Stress, Normal & Shear Strain and Stress-Strain Curve.

2. Elastic Stuff:

Elasticity Tool, and Three Basic Tools of Linear Elasticity.

3. Partially Elastic Stuff:

Elastic-viscoplastic tool and Visoelastic tool.

4. Ways to Get/Avoid a Mechanical DNF (Did Not Finish):

six itemized ways, details on Catastrophic Failure and Excessive Deformation.

Total number of safety ideas = 70, Total number of safety principles = 50,

Total number of illustrations = 61