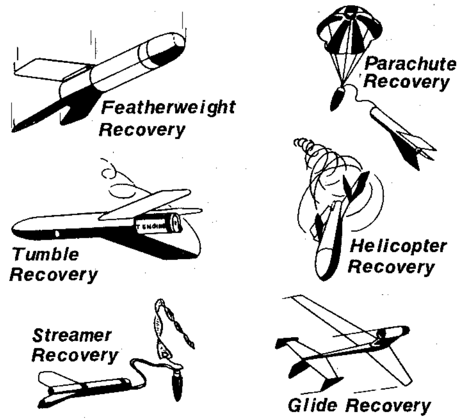
Technical Note TN-3

IS THAT PARACHUTE TOO BIG?

By Robert L. Cannon

Recovery systems have one function - the safe return of the model rocket. The rocketeer has a choice of several recovery systems, the most popular of which is parachute recovery.

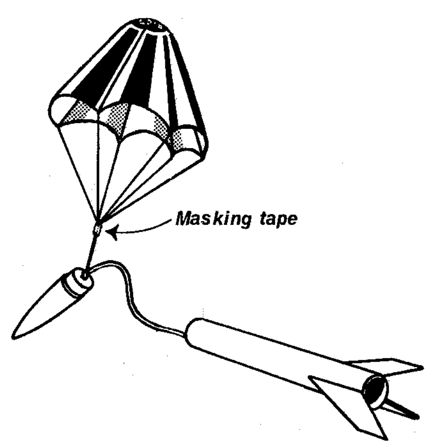


Regardless of the recovery system chosen, it must let the rocket fall back to the ground gently. To accomplish this the rocket must not undergo “free fall”. A lightweight model rocket of balsa and cardboard can fall fairly rapidly. The streamlined shape of the rocket permits it to fall at close to the maximum possible acceleration for a body falling freely through the air. This rate of acceleration is 32 feet per second per second. This means that an object will be falling 32 feet per second faster at the end of each second than it was falling at the start of that second. The actual maximum velocity a freely falling body can reach is called its terminal velocity. This velocity is less than the theoretically possible velocity because the air through which it is falling slows down the rocket, just as it slowed the rocket’s powered flight. This drag slows the rocket’s movements.

Various devices are used to increase the effect of this aerodynamic drag so that the rocket falls very slowly. The greater the drag for a given weight, the slower the rocket falls. Too little drag could let the rocket fall fast enough to be damaged on impact. With too much drag, a breeze may cause your model to drift a great distance downwind before it returns to the ground.

The higher your rocket is at apogee, the longer it will take to return with a parachute of a specific size. The bigger the parachute, the longer the rocket will stay in the air. If you consistently launch your rockets to high altitudes or if you live in a windy area, having too much parachute can be a big problem! There are several ways of letting your rockets fall faster yet still be safely recovered by parachute.

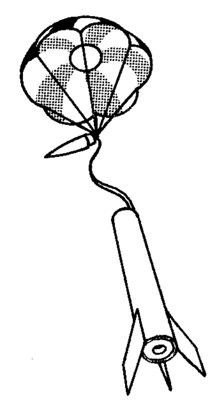
One simple way to reduce the drag a parachute creates is to “reef in” the shroud lines. This is done by effectively shortening the shroud lines to keep the parachute from coming fully open. This can be done by “shortening” the shroud lines with masking



tape or a piece of string.

Another method of reducing the drag caused by a parachute is to cut a circular hole out of the center of the ‘chute. Experiment to determine the best size of hole for the parachute in the rocket you are using. Start with a small hole and slowly enlarge it until the rocket falls fast enough so it doesn’t drift far, yet slowly enough to be recovered safely. Be careful so that the hole is always round and has no sharp edges. The shock of opening can exert tremendous force on the parachute so any cut or sharp corner can rip under the stress.

Of course, you can speed the descent of your rocket by selecting a smaller-sized parachute. This is very easy if a snap swivel is attached to



each of your parachutes. Pre-test the size of the parachute for safe recovery by hand-tossing the model into the air with the parachute hand-wadded but outside the body tube or by dropping the rocket with the parachute unfurled from a high elevation, such as a second or third floor window.

Streamers can also be used. Test carefully since streamers work best on very light weight-models.