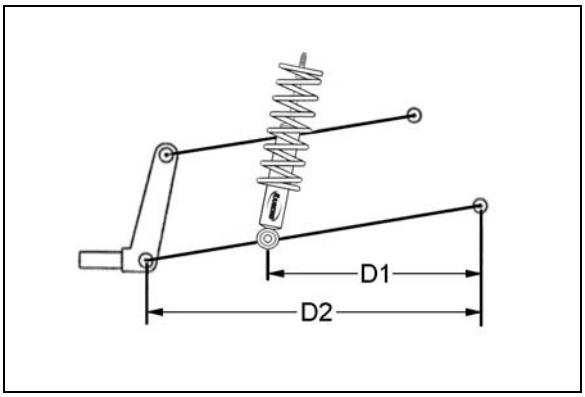
Spring Selection Guide

To determine a basic spring setup for the Rancho Buggy, Wheel Rate and Suspension Frequency must be known. **Wheel Rate** is the actual spring rate at the wheel. The value is measured in lbs/inch or N/mm. **Suspension Frequency** is the number of oscillations of the suspension over a given time period when a load is applied. The value is measured in cycles per second or hertz (Hz).

I. As a guideline only, choose the following suspension frequencies that best describes your type of off-road driving:
For rock crawling up to 15 mph, start with .75 Hz on the front & .93 Hz on the rear.
For 4wd accessible trails up to 30 mph, start with 1.1 Hz on the front & 1.375 Hz on the rear.
For general on & off-road driving, start with 1.35 Hz on the front & 1.688 Hz on the rear.



A-Arm Suspension

II. Calculate the Wheel Rate (WR) for a given frequency.

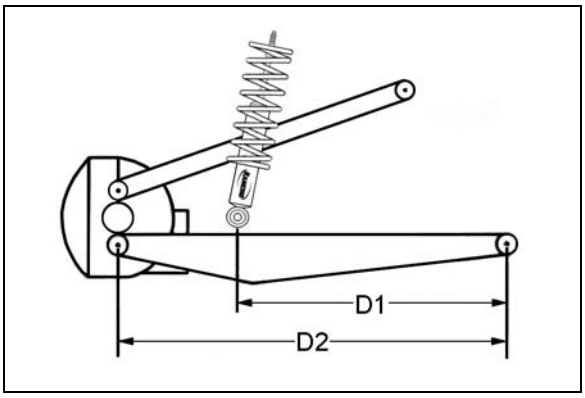
$$WR = \left(\frac{SF}{3.128}\right)^2 Y$$

SF=Suspension frequency
Y=Sprung weight (weight of vehicle actually sitting on spring)

III. Calculate the Motion Ratio (MR).

$$MR = \left(\frac{D1}{D2}\right)^2$$

A-Arm Suspension:
D1=Distance from spring centerline to control arm inner pivot center
D2=Distance from outer ball joint to control arm inner pivot center
Link Suspension:
D1=Distance from lower spring mount to frame pivot
D2=Distance from axle pivot to frame pivot
Straight Axle Suspension:
MR=1



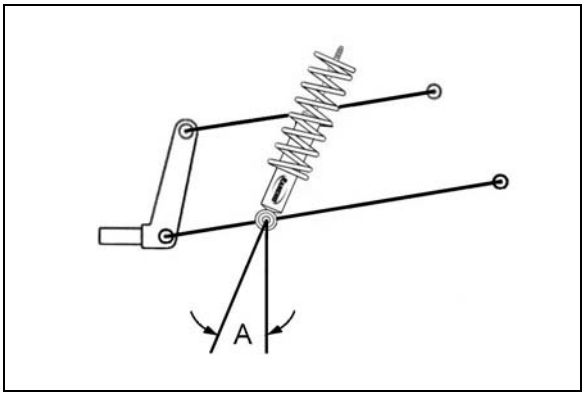
Link Suspension

IV. Calculate the Angle Correction Factor (ACF) for all suspensions except the straight axle.

$$ACF = \text{cosine } A$$

A=Spring angle from vertical

Angle	0°	3°	6°	9°	12°
ACF	1	.9986	.9945	.9877	.9782



Angle Correction Factor

V. Calculate the desired Spring Rate (SR).

$$SR = \frac{WR}{(MR)\ (ACF)}$$

WR=Wheel rate
MR=Motion ratio
ACF=Angle correction factor

Dual Spring Setup

On dual spring setups, the coil with the larger diameter wire is the main spring and the coil with the smaller diameter wire is the tender spring. The combination of main and tender springs creates a primary and secondary spring rate. The primary spring rate adds both coils in parallel. The secondary spring rate is equal to the main spring rate.

VI. Use the following formula to calculate primary spring rate (Xp):

$$Xp = \frac{(Xt)\ (Xm)}{Xt + Xm}$$

Xt=Spring rate of tender spring
Xm=Spring rate of main spring