```
%Early Pacejka tire model based on SAE paper890087
%Greg Locock7 Aug 2008- Sept 2009
%Units are as Pacejka
%alpha and gamma in degrees, Fz in kN
%Fy in N
%Polarity is not checkeds.
%camber seems a bit dodgy.
```

$a0 := 1.3$

$a1 := -22.1$

$a2 := 1011$

$a3 := 1078$

$a4 := 1.82$

$a5 := .208$

$a6 := 0$

$a7 := -.354$

$a8 := .707$

$a9 := .028$

$a10 := 0$

$a11 := 14.8$

$a12 := .022$

$a13 := 0$

//These are the vertical force and camber to be used
for each of the 5 tests

$$FZ := \begin{pmatrix} 2 \\ 4 \\ 6 \\ 8 \\ 5 \end{pmatrix} \qquad CAMBER := \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 8 \end{pmatrix}$$

$useoffsetsy := 1$

$$\text{for } i := 1, i \leq \text{rows}(FZ), i := i + 1$$
$$\quad Fz := FZ_{i\,1}$$
$$\quad gamma := CAMBER_{i\,1}$$
$$\quad \text{for } j := 1, j \leq 100, j := j + 1$$
$$\quad\quad \alpha := \frac{(j - 50)}{5}$$
$$\quad\quad SA_{1\,j} := \alpha$$
$$\quad\quad C := a0$$
$$\quad\quad D := a1 \cdot Fz^2 + a2 \cdot Fz$$
$$\quad\quad BCD := (a3 \cdot \sin(a4 \cdot \text{atan}(Fz \cdot a5))) \cdot (1 - a12 \cdot |gamma|)$$
$$\quad\quad Sh := a9 \cdot gamma \cdot useoffsetsy$$
$$\quad\quad Sv := ((a10 \cdot Fz^2 + a11 \cdot Fz) \cdot gamma \cdot useoffsetsy)$$
$$\quad\quad E := a6 \cdot Fz^2 + a7 \cdot Fz + a8$$
$$\quad\quad \varphi := (1 - E) \cdot (\alpha + Sh) + \frac{E}{B} \cdot \text{atan}(B \cdot (\alpha + Sh))$$
$$\quad\quad B := \frac{BCD}{C \cdot D}$$
$$\quad\quad FY_{i\,j} := \text{eval}(D \cdot (\sin(C \cdot \text{atan}(B \cdot \varphi))) + Sv)$$

$FY := FY \cdot .001$

//Now define the curves for the display

for $j := 1, j \le 100, j := j + 1$

$\begin{vmatrix} m_{j\,1} := SA_{1\,j} \\ m_{j\,2} := FY_{1\,j} \\ n_{j\,1} := SA_{1\,j} \\ n_{j\,2} := FY_{2\,j} \\ o_{j\,1} := SA_{1\,j} \\ o_{j\,2} := FY_{3\,j} \\ p_{j\,1} := SA_{1\,j} \\ p_{j\,2} := FY_{4\,j} \\ q_{j\,1} := SA_{1\,j} \\ q_{j\,2} := FY_{5\,j} \end{vmatrix}$

$\left\{ \begin{matrix} m \\ n \\ o \\ p \\ q \end{matrix} \right.$
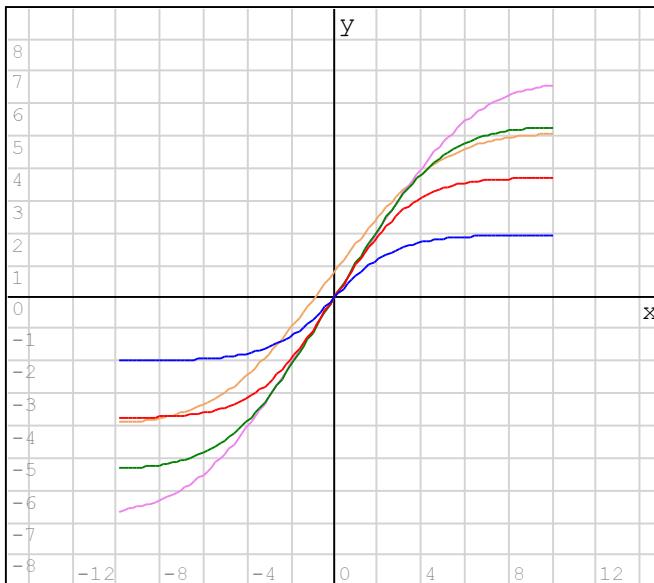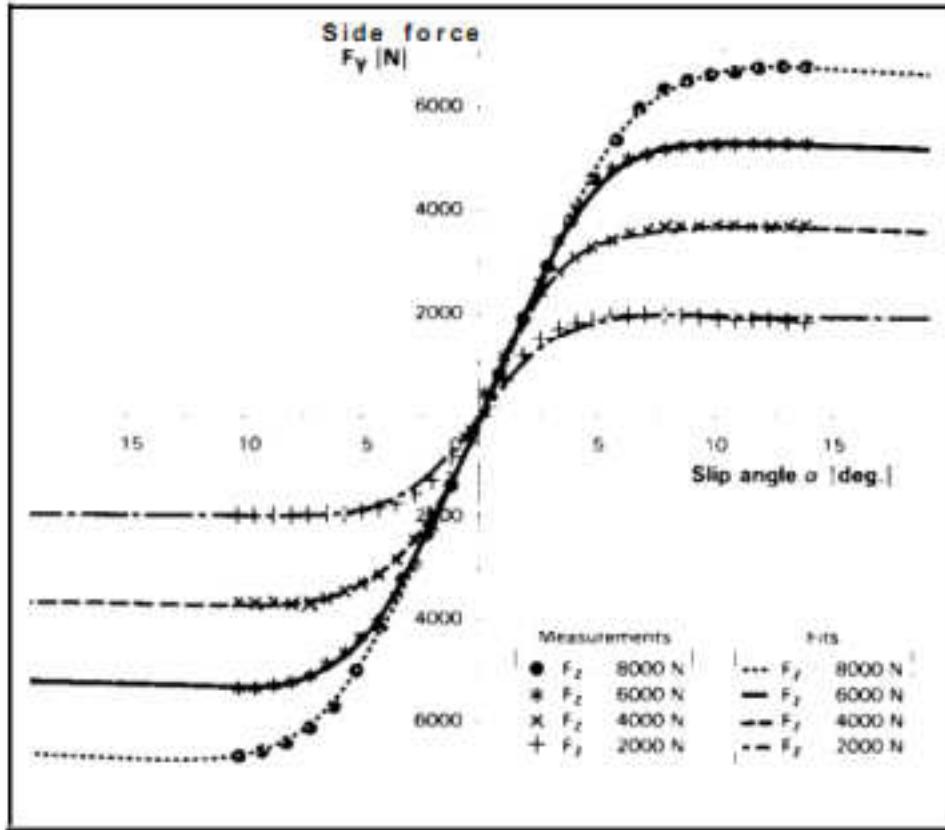
Fig. 6 - Side force characteristics fitted using the tyre formula which includes the influence of the vertical load, compared with measured data.