

KEVLAR FIXED EFFECTS GAMMA PRIOR

```
#####  
##### This program represents the collaborative efforts of Avery Ashby, #####  
##### Ramon Leon, and Jayanth Thyagarajan. This is an inclusive odc file #####  
##### containing the model, data, and initial values. March 20, 2002. #####  
#####
```

```
#####  
##### MODEL #####  
#####
```

```
model KevlarFixedEffectsGammaPrior;  
{
```

```
##### This loop creates prior values for spools 1 through 7 #####
```

```
for(i in 1:N - 1) { # N is the number of spools (8)  
  b[i] ~ dnorm(0,0.001) # Fixed effect of spool  
}
```

```
##### End of loop #####  
#####
```

```
##### Method of dealing with last spool effect #####
```

```
b[8] <- 0 # Eighth spool set to zero effect  
intercept ~ dnorm(0,0.001) # Intercept prior  
#####
```

```
##### Generation of other prior values #####
```

```
beta.stress ~ dnorm(0,0.001) # Fixed stress effect  
r ~ dgamma(1,0.2) # Shape parameter of Weibull  
# inverse scale parameter that is used by  
# winBUGS parameterization for gamma
```

```
#####
```

```
##### This loop reads in the data and calculates Weibull scale parameter #####
```

```
for(j in 1:M) { # M is the number of rows in the data (108)  
  log(eta[j]) <- intercept + beta.stress * log(stress[j]) + b[spool[j]] # This is the function for mu in the Weibull  
  lambda[j] <- pow(eta[j],-r) # Rescale into lambda parameterization  
} # for use in winBUGS 1.4
```

```
##### End of loop #####  
#####
```

```
##### This loop contains the likelihood for failure times as exact or censored #####
```

```
for(j in 1:M) {  
  t[j] ~ dweib(r,lambda[j])(cen[j],) # Failure times are Weibull or censored  
}
```

```
##### End of loop #####  
#####
```

```
##### Calculates failure quantiles and prediction distributions for a given spool #####
```


1275.6,1536.8,1755.5,2046.2,6177.5,225.2,503.6,1087.7,1134.3,
1824.3,1920.1,2383,2442.5,2974.6,3708.9,4908.9,5556,6271.1,
7332,7918.7,7996,9240.3,9973,11487.3,11727.1,13501.3,14032,
29808,31008,4000,5376,7320,8616,9120,14400,16104,20231,
20233,35880,NA,NA,NA,NA,NA,NA,NA,NA,NA,NA,NA))

```
#####  
                                End of data                                #####  
#####
```

```
#####  
                                INITIAL VALUES                                #####  
#####
```

```
list(intercept = 84.1, beta.stress = -23.1, r = 1.21)          # initial values based on Crowder et al. (1991)
```

```
list(intercept = 1, beta.stress = -1,r = 1)
```

```
#####  
                                End of initial values                                #####  
#####
```