Project Survey and Distress Identification

(AC)   (JPCP, JRCP, CRCP)

NDT   NDT   Dynaflect
Road Rater   Dynatest FWD

BISDEF   MODULUS

BISAR
126   DMD, SCI,   BCI

BISDEF   B-8   NDT

A three-layer flexible pavement has been tested with a Falling Weight Deflectometer and the following data was obtained:
Pavement Structure: 3 in. asphalt concrete, 12 in. granular base, silty clay subgrade

FWD Load = 12,000 pounds
Radius of load plate = 5.9 in.
Measured deflection basin:

Offset Distance (in.)	Deflection (mils)
0	43
12	20
24	11
36	8

Estimate the elastic modulus of each layer using the BISDEF program, assuming full adhesion along the layer interfaces. Make additional proper assumptions, if necessary.

Using the results obtained from above, compute critical strains at the bottom of the AC layer and on the top of the subgrade layer. The elastic layered program, BISAR, can be used for this purpose. Also compute the expected or "allowable" number of load repetitions to "failure" using the following AC fatigue model and a subgrade permanent deformation model developed by the Corps of Engineers.

$$(a)\, \log_{10} N_{ac} = 5.01 * \log_{10} TSTRAIN - 2.6651 * \log_{10} \frac{E_{ac}}{14.22} - 0.392$$

$$(b)\, N_{sg} = \left(\frac{0.005511}{VSTRAIN} \right)^{6.527}$$

Where:

TSTRAIN = tensile strain at the bottom of the AC layer;

E_{ac} = elastic modulus of the AC layer, psi;

VSTRAIN = vertical strain on the top of the subgrade soil; and

N_{ac} and N_{sg} = allowable load applications based on above two equations.