

MATERIAL TEST i104

Deflection Correcting Program

The machines of the Shimadzu Autograph series are universal testing machines that feature excellent performance and expandability based on its multiple-CPU distributed processing and digital control system. The machines of this series contain a software system package and a field oriented data processing system designed to meet the needs of customers in a variety of application fields.

1. Outline

Loads applied to a specimen also work on the testing machine in use at the same time, producing a small amount of deflection in the main body and jigs. Testing machines are designed to resist such loads, and are almost free of influence from such deflection except in cases when tests are performed under an extraordinary degree of precision or on special materials.

The deflection correcting software of the Shimadzu Autograph Series, which allow deflection data to be custom programmed to the machine in use, calculates pure values by deducting deflection factors from measured values. Correction data is applied following retrieval of test data from their respective files, so correction is possible even when testing conditions or jigs change.

Correction is applicable to tensile, compression, and tensile-compression tests.

2. Software specifications

The software for deflection correction comprises the following items:

- 1) Calculation of correction factor from deflection characteristic curve
- 2) Presentation in the form of processed data and stress-strain curves after deflection correction of measured data in the files

3. Details of software

1) Calculation of deflection correction factor

In order to correct deflection, the deflection characteristics of the machine in use must have been memorized in advance.

Firstly, a blank operation without specimen shall be conducted, and the deflection characteristic data of the main body and jigs shall be recorded onto floppy disks.

Instead of storing a characteristic curve itself, the program records an equation approximated by the least square method for the characteristic curve.

This method significantly saves time and memory size as all that is required to save a curve is the inputting of some parameters for the approximated equation.

Just specify a range for approximation of a stress-strain curve to be displayed on the CRT, and the computer automatically calculates a correction factor for deflection. (See Figs.1 and 2.)

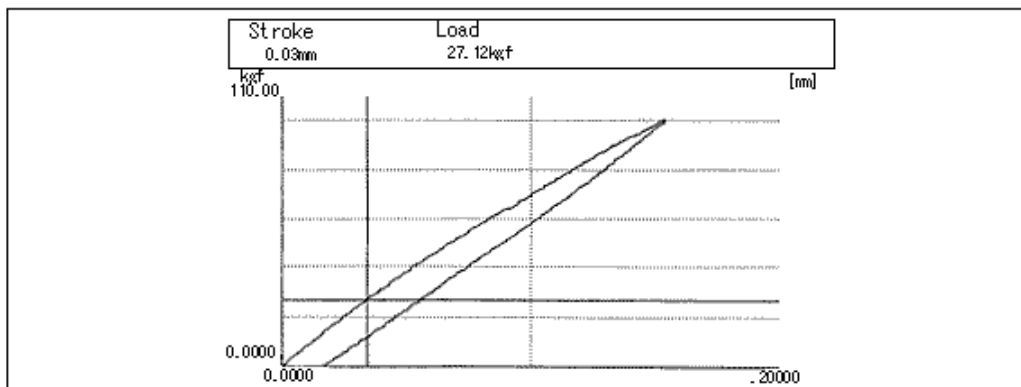


Fig.1 A Display Image for Calculation of Correction Factor

	Date	MENO	Change Point	
Tensile	90/06/04	TEST	63.2	65.28
a=-21.5363	b=97.2726	c=-2.34885		
a= 15.3787	b=24.6012	c= 32.4796		
a= 1.57299	b=59.5485	c= 10.8471		
a=-15.4449	b=88.2599	c=-1.39172		
Compression	90/04/25	0-1000kgf	445.962	321.414
a=36340.3	b=10119.1	c=-18.8169		
a=32709.1	b=10422.1	c=-25.2426		
a=29364.7	b=10867.8	c=-37.1766		
a=47286.7	b=9286.13	c=-5.16362		
Tensile-Compression	90/04/25	0-1000kgf	-61.4705	-23.3025
a=-7.34101E-12	b=-2.15226E-10	c= 8.04684E-05	d= 9.56906E-04	
a=-1.07494E-12	b= 8.29984E-10	c= 7.86552E-05	d= 7.82472E-04	
a=-7.75847E-13	b=-1.96127E-09	c= 7.89703E-05	d= 2.10358E-03	
a=-1.02644E-11	b=-3.91865E-09	c= 8.19338E-05	d= 2.41366E-03	
Tensile-Compression	90/04/25	0-1000kgf	-83.1659	73.9253
a= 1.4112E-11	b= 1.78127E-08	c= 8.08834E-05	d=-5.03415E-04	
a=-1.31193E-11	b= 6.95419E-09	c= 8.30438E-05	d= 3.22021E-05	
a=-9.30914E-12	b= 2.87391E-09	c= 8.15197E-05	d= 1.61042E-03	
a= 1.17614E-11	b= 1.18691E-08	c= 8.00336E-05	d= 1.11523E-03	

Fig.2 Calculated Correction Factors

2) Correction of deflection

This is a mode to display the test data with deflection factors deducted using the original data obtained through calculation of correcting deflection factors. Deflection free stress-strain curves can be drawn if the data to be corrected is saved in advance onto floppy disks and then recalled for deflection correction (See Fig. 3). Data processing is performed on the corrected data.

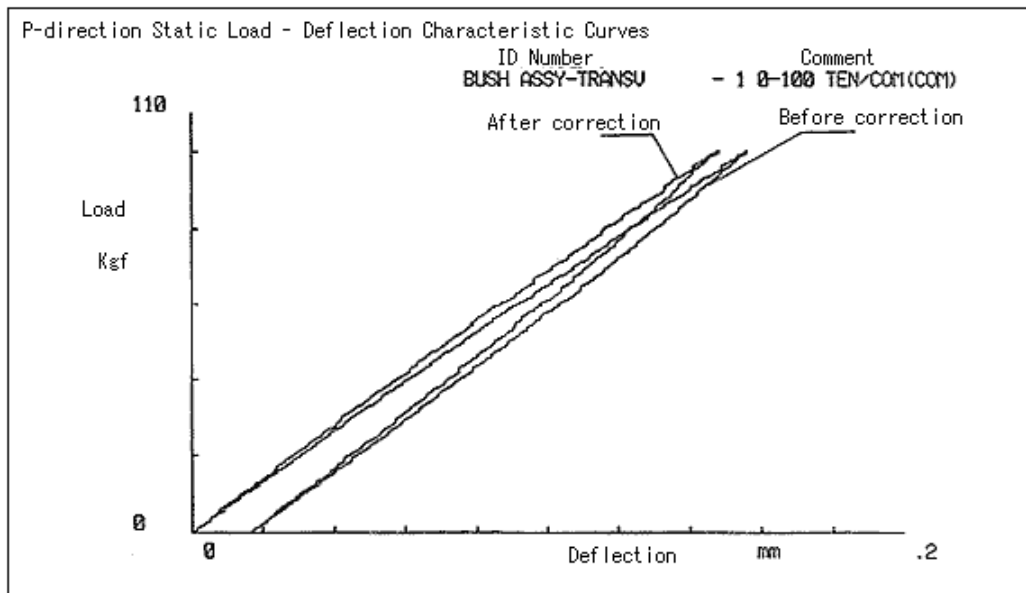


Fig.3 Result of Deflection Correction

* Please be advised that data obtained before the implementation of the current Weights and Measures Law may be presented in terms of gravimetric unit.



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