زبان تخصصی مهندسی مکانیک

فصل سوم

3-2- تنش و کرنش-بارگذاری محوری (Stress and Strain-Axial Loading)

3-2-1- مقدمه (Introduction)

You will also see that, while the behavior of most materials is independent of the direction in which the load is applied, the response of fiber-reinforced composite materials depends upon the direction of the load.

From the stress-strain diagram, we can also determine whether the strains in the specimen will disappear after the load has been removed, in which case the material is said to behave elastically or whether a permanent set or plastic deformation will result.

One of sections is devoted to the phenomenon of fatigue, which causes structural or machine components to fail after a very large number of repeated loadings, even though the stresses remain in the elastic range.

معنی	کلمه	معنی	کلمه
رفتار	behavior	مستقل	independent
پاسخ	response	الیاف	fiber
تقویت کردن	reinforce	نمونه، مدل	specimen
ناپدید شدن، از بین رفتن	disappear	رفتار کردن	behave
دائمی	permanent	پدیده	phenomenon
خستگی	fatigue		

Also statically indeterminate problems will be considered, i.e., problems in which the reactions and the internal forces cannot be determined from statics alone. The equilibrium equations (which are) derived from the free-body diagram of the member under consideration must be complemented by relations involving deformations; these relations will be obtained from the geometry of the problem.

Additional constants associated with isotropic materials i.e., materials with mechanical characteristics independent of direction will be introduced. They include Poisson's ratio, which relates lateral and axial strain, the bulk modulus, which characterizes the change in volume of a material under hydrostatic pressure, and the modulus of rigidity, which relates the components of the shearing stress and shearing strain. Stress-strain relationships for an isotropic material under a multiaxial loading will also be derived.

معنی	کلمه	معنی	کلمه
عدل	equilibrium	استخراج کردن	derive
معادله	equation	کامل کردن	complement
شامل	involving	هندسه، شکل	geometry
اضافه	Additional	ثابت	constant
وابسته، همراه	associated	خاصیت	characteristic
شامل شدن	include	ضریب	ratio
جانبی	lateral	توده، حجم	bulk
مشخص کردن	characterize	فشار	pressure
هیدرواستاتیک	hydrostatic	اجزا	components
		چند محوری	multiaxial

Stress-strain relationships involving several distinct values of the modulus of elasticity, Poisson's ratio, and the modulus of rigidity, will be developed for fiber-reinforced composite materials under a multiaxial loading. While these materials are not isotropic, they usually display special properties, known as orthotropic properties, which facilitate their study.

In the text material described so far, stresses are assumed uniformly distributed in any given cross section; they are also assumed to remain within the elastic range. The validity of the first assumption is discussed, while stress concentrations near circular holes and fillets in flat bars are considered.

معنی	کلمه	معنی	کلمه
مختلف، مجزا	distinct	توسعه دادن، بسط دادن	develope
ممکن ساختن	facilitate	ارتوتروپیک	orthotropic
توصیف کردن	describe	اعتبار، صحت	validity
تمرکز	concentration	قیلت	fillet
پسماند	residual		

Some sections are devoted to the discussion of stresses and deformations in members (which are) made of a ductile material when the yield point of the material is exceeded. As you will see, permanent plastic deformations and residual stresses result from such loading conditions.