CHAPTER II

STRENGTH OF MATERIALS

III. STRENGTH OF MATERIALS
III.2 –COMPOSITES MATERIALS

I - TERMINOLOGY :

English	French	Arabic
Settlement	Tassement	هبوط أرضي
A concrete	Béton	خرسانة
Admixture	Adjuvant	إضافة
The strain	Deformation	تشوّه
The aggressive soil	Sol aggressif	تربة عدوانية
Bearing capacity of soil	Capacité portante du sol	قوة تحمل التربة
Safety factor	Facteur De sécurité	معامل أمان
The truss	Une ferme	شبكّة
The strength	Force Résistance	مقاومة
The live load	Charge d'exploitation	حمولة أستغلال
REINFORCEMNT	RENFORT	تسليح

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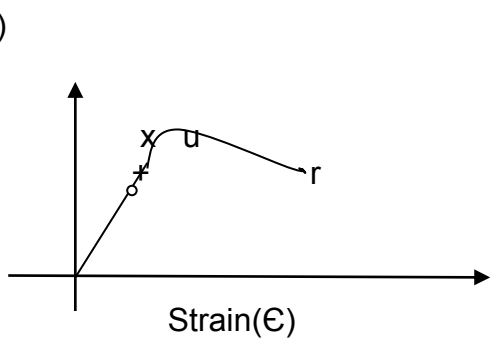
II-a/ Design Properties of materials :

This graph of the behavior of ductile material like the steel

o - proportional limit
\+ - Elastic limit
X-Yield point
u- Ultimate strength
r- Failure point



Stress strain curve of steel

III-Composite materials

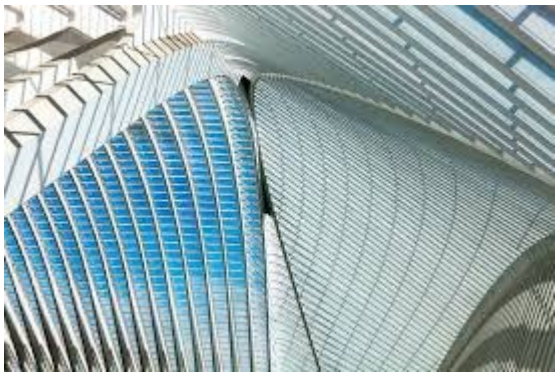
Definition :
A composite material is a combination of two materials with different physical and chemical properties. When they are combined they create a material which is specialised to do a certain job, for instance to become stronger, lighter or resistant to electricity. They can also improve strength and stiffness. The reason for their use over traditional materials is because they improve the properties of their base materials and are applicable in many situations

Task 02:
(Translate to french the text above)

Définition:
Un matériau composite est une combinaison de deux matériaux aux propriétés physiques et chimiques différentes. Lorsqu'ils sont combinés, ils créent un matériau spécialisé pour faire un certain travail, par exemple pour devenir plus fort, plus léger ou résistant à l'électricité. Ils peuvent également améliorer la résistance et la rigidité. La raison de leur utilisation par rapport aux matériaux traditionnels est qu'ils améliorent les propriétés de leurs matériaux de base et sont applicables dans de nombreuses situations

Examples of Composite Uses

- Electrical equipment
- Aerospace structures
- Infrastructure
- Pipes and tanks
- Homes can be framed using plastic laminated beams (photo below)



IV- Components of Composite Materials

1. Fibres

The choice of fibre frequently controls the properties of composite materials. Carbon, Glass, and Aramid are three major types of fibres which are used in construction. The composite is often named by the reinforcing fibre, for instance, CFRP for Carbon Fibre Reinforced Polymer. The most important properties that differ between the fibre types are stiffness and tensile strain.

Fig. 1: Glass, Carbon, and Aramid Fibre

2. Matrices

The matrix should transfer forces between the fibres and protect the fibres form detrimental effects. Thermosetting resins (thermosets) are almost exclusively used. Vinylester and epoxy are the most common matrices.

V- Exercise: Choose the false or true answer for the statements below

Statement	False / True
1) The foundation **basement depth** could be more than 50 cm	.....
2) The **settlement of** foundation could present **hazardous** for heavy constructions	.....
3) The **safety factor** is essential for building design calculation.	.....
4) The shear wall is recommended **for the resistance** of the seismic loading.	.....
5) The concrete quality **strength** for building structures could be less than 100 bars.	.....
6) The seismic zone in desert Algerian sahara **is classified zone 0** in Algerian code of practice	