

مشاريع التخرج لطلبة قسم هندسة التشييد و البناء

بالمعهد العالى للهندسة و التكنولوجيا – البحيرة

العام الدراسى 2024-2025

تتجدد كل عام موضوعات وانواع مشاريع التخرج لطلبة المستوى الرابع بقسم هندسة التشييد و البناء كما يتم الاستعانة بأساتذة من الجامعات الحكومية للاشراف على بعض المشاريع وايضا فى لجان مناقشة المشاريع المختلفة بالقسم .
والمشاريع المفتوحة هذا العام الدراسى:

1- مشروع ميكانيكا التربة و الاساسات

2- مشروع تصميم المنشآت المعدنية

3- مشروع الهندسة المساحية

4- مشروع مقاومة و اختبارات المواد

5- مشروع الهندسة الصحية

6- مشروع تصميم المنشآت الخرسانية

7- مشروع هندسة الطرق و النقل و المرور

8- مشروع ادارة المشروعات

كما تم الاستعانه بأساتذة من الجامعات الحكومية للاشراف على بعض المشاريع:

د/ احمد نصر عميد جامعة طنطا

د/ طارق ابراهيم كلية الهندسة جامعة الاسكندرية

د/ سامى عياد كلية الهندسة جامعة الاسكندرية

رئيس قسم هندسة التشييد و البناء

د/ سحر عبد الفتاح

مشروع ميكانيكا التربة وتصميم الاساسات

تحت اشراف/ أ.د. احمد محمد نصر

- يقوم المشروع علي دراسته تصميم الاساسات السطحيه والاساسات العميقه وكذلك الاختبارات المعملية علي عينات التربه لتوصيفها توصيفا كاملا لعمل تقرير التربه وأيضا نقاط بحثيه ومن ضمن وحدات المشروع :

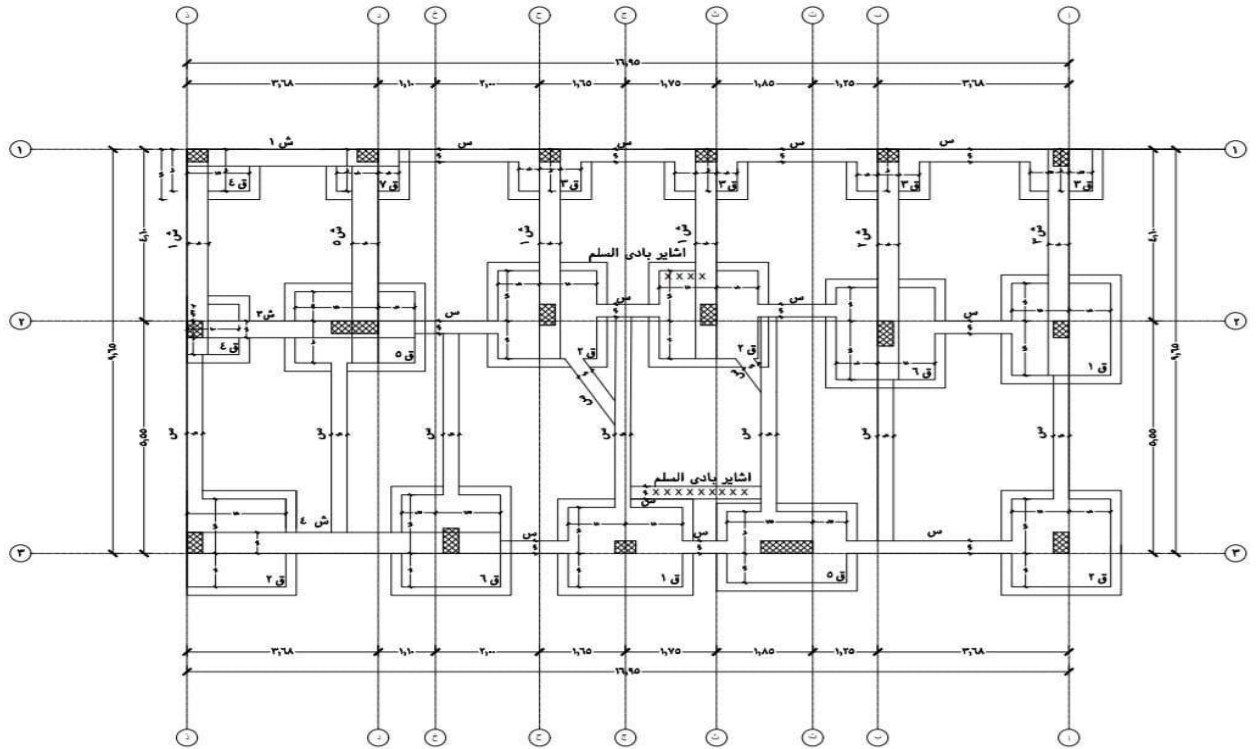
◀ الوحدة الاولى : تصميم الاساسات السطحيه ◀ الوحدہ الثانيه

: تصميم اللبشه وخوازيق السند

◀ الوحدة الثالثه : تصميم الاساسات العميقه (الخوازيق) ◀ الوحدہ الرابعه :

نقاط بحثيه

◀ الوحدہ الخامسه : الاختبارات المعملية وتقرير التربه



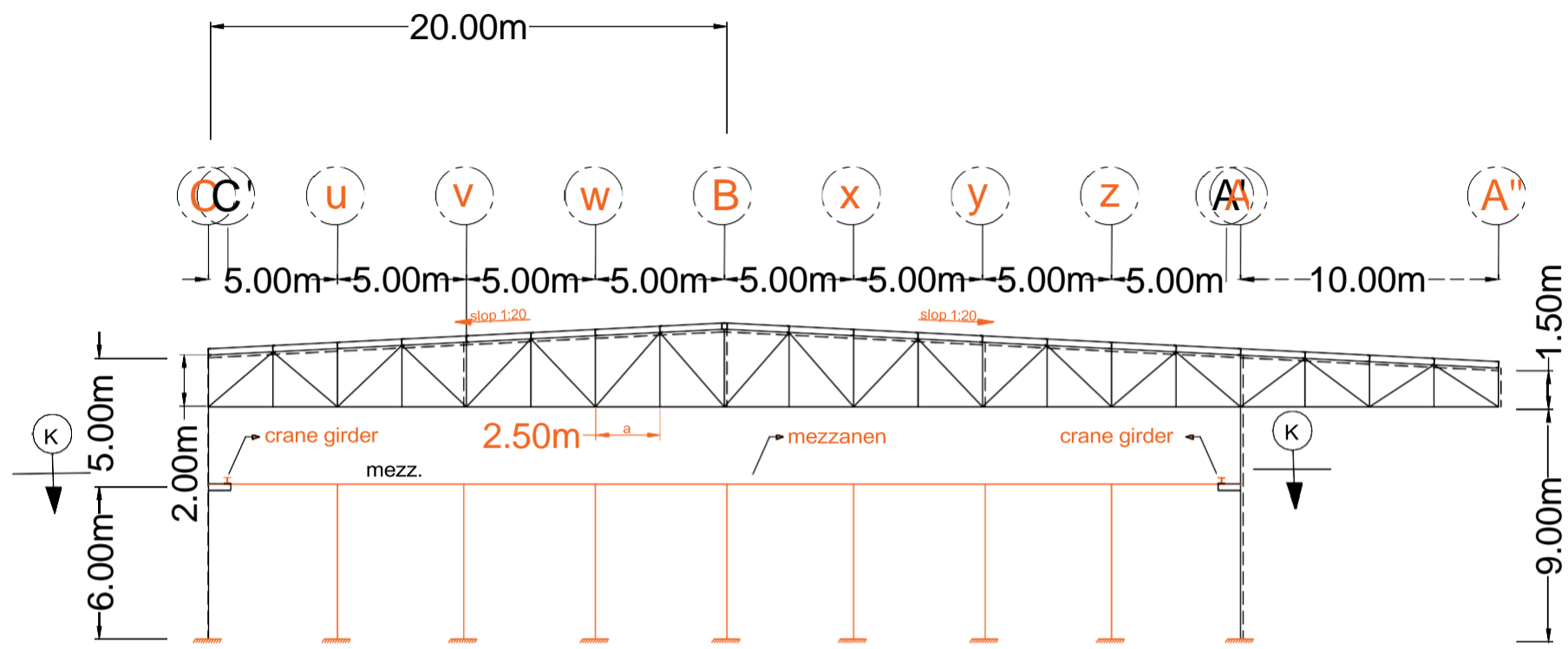
Steel project

Our steel project is designing a building which is a factory plus a warehouse; 60 m long X 50 m width, 10.5 m eave height and the clear height is 8 m. the building is a multi-span, the first span is the factory with 40 m width, it consists of one gable at the middle, a crane and a mezzanine. While the second span is the warehouse and it is 8 m width. The length of the building is divided into 10 grid lines (from G.L (1) to G.L (10)) spaced at 6 m except for the spacing between grid lines 8 and 9 is 12 m.

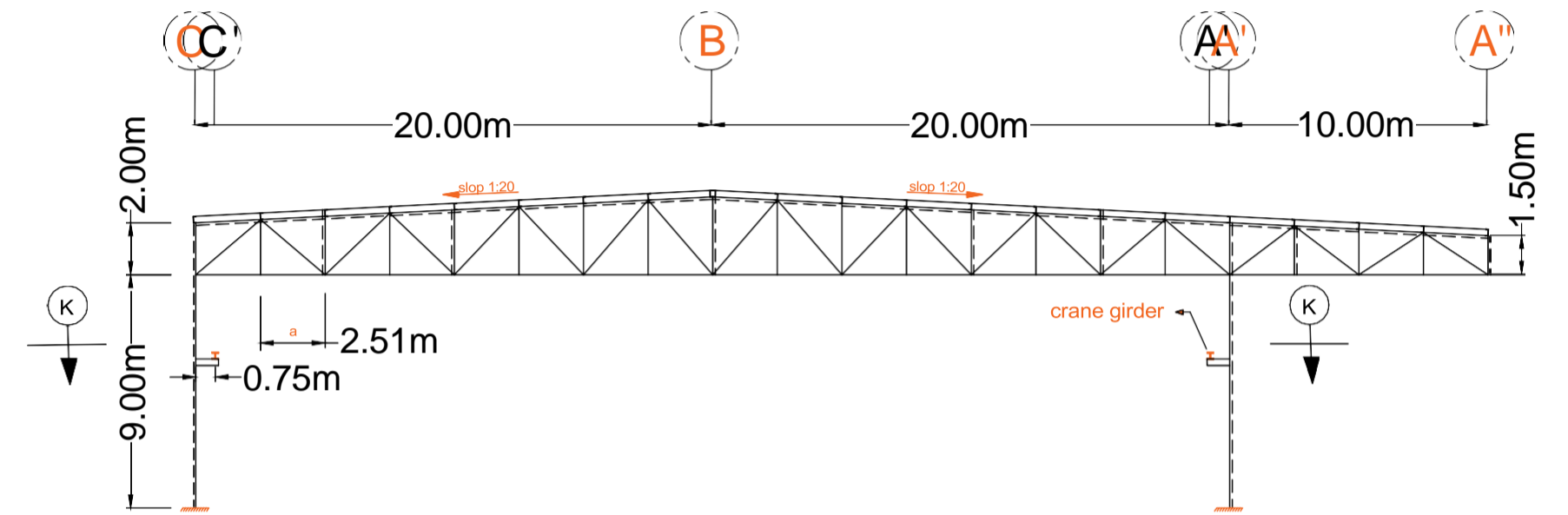
The structure system of the cross section is a truss while the structure system of the endwalls is a rigid frame. An effective bracing system is applied all over the building to provide stability and resist lateral loads as follows; a horizontal transverse bracing to resist wind loads another horizontal bracing in the longitudinal direction is provided to resist the crane longitudinal force and a vertical bracing will be presented along the sidewalls and endwalls at the location of the transverse horizontal bracing and longitudinal horizontal bracing respectively. Finally, a cat walk will be provided along the crane girders for the following reasons, act as a bracing to increase the lateral stability of the mainframe columns at the location of the crane bracket in addition to that it will be used for maintenance purposes.

The main challenge in this project is the design of the crane bridge, the purlins and the crane beams located between grid lines 8 and 9. The crane bridge design is tedious because its span will be 40 m length, for that reason a built up beam will be customized and designed specially to resist its deflection and its own weight. Also a built up beam will be designed and provided for the crane beam at the 12 m span between grid lines 8 and 9, however, the purlins at this span will be customized as a space truss system.

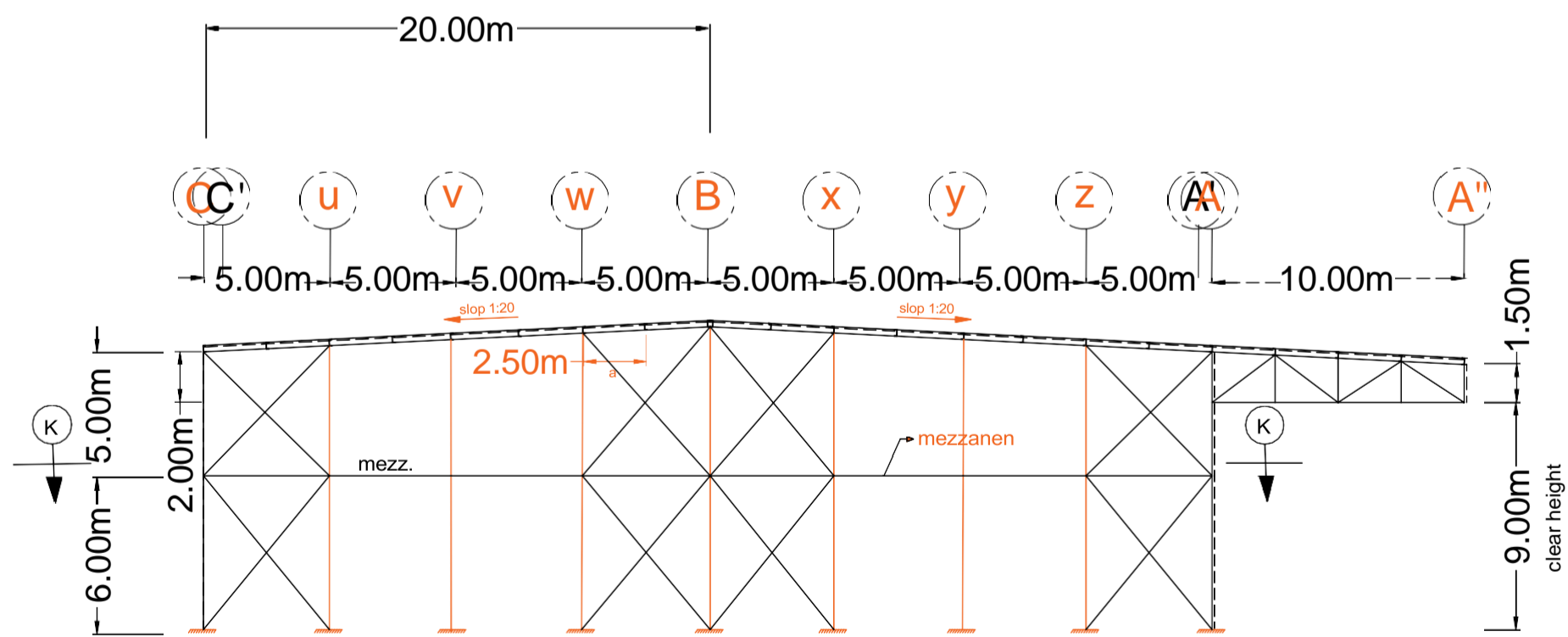
By the end of this project a full design package for the building will be provided. The design package includes; a set of drawings showing the planning of the building plus details for the special items and its connections, the design notebook for the full items of the building plus its connections and finally a set of sap files showing the analysis of the building in addition to the straining actions.



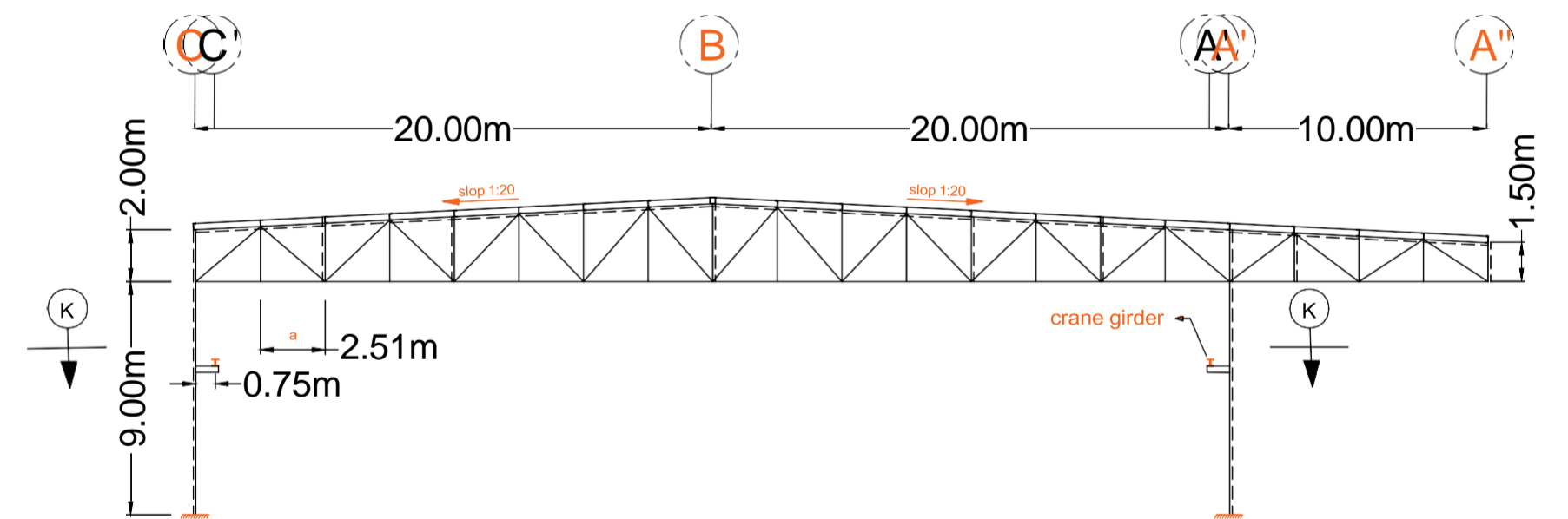
elevation @ G.L(2,9)



elevation @ G.L(7,8 & reversed @ 3,4)



elevation @ G.L(1) and reversed @ (10)



elevation @ G.L(6 & reversed @ 5)

INTRODUCTION

Being a co-product of iron manufacture in a modern blast furnace, molten blast furnace slag can be processed to produce a variety manufactured products. This reference data sheet gives guidance on the properties, characteristics and application of air-cooled blast furnace slag (BFS) or more commonly known as BFS aggregates.

Molten blast furnace slag is tapped from the furnace into ground bays where it air-cools to form a crystalline rock-like material. When cooled, the BFS is crushed and screened to a full range of aggregate sizes. There has been a significant amount of information published on the properties of BFS aggregates and further details on definitions are available in other technical literature.



Slag Aggregates Preparation Plant

Discussion of BFS as an aggregate requires a review of how natural and other aggregates are used in concrete and other civil engineering applications. The term 'aggregate' encompasses materials such as sand, gravel and crushed stone, which includes fine and coarse materials. Natural aggregates are mined in quarries situated around basaltic, limestone, granite and other geological deposits. The extracted material is crushed and screened into designated sizes to produce coarse or fine aggregate products. AS2758 describes requirements for aggregate and rock for engineering purposes and is published in a number of parts of which Part 1 discusses concrete aggregates. Aggregates for concrete are essentially defined in this standard by size (an indication of the maximum size of particle present) as follows:

- Coarse aggregate (nominal size greater than or equal to 5 mm);
- Fine aggregate (nominal size of less than 5 mm);
- Heavyweight aggregate (particle density on a dry basis of greater than or equal to 3.2 tonnes/m³);
- Lightweight aggregate (particle density on a dry basis of less than 2.1 tonnes/m³ and greater than or equal to 0.5 tonnes/m³), and

- Normal weight aggregate (particle density on a dry basis of less than 3.2 tonnes/m³ and greater than or equal to 2.1 tonnes/m³).

Key properties described in AS2758.1 include:

- Particle size
- Particle Density
- Water absorption
- Bulk density
- Particle Shape
- Wet strength
- Los Angeles value
- Sodium sulfate soundness
- Chloride and sulfates
- Alkali aggregate reaction
- Iron Unsoundness
- Falling or dusting unsoundness

The properties described above are discussed in the following sections for BFS aggregates. Table 1 summarises typical results reported for BFS aggregates 10mm and 10-20mm size aggregate products. Methods of sampling and testing of aggregate are described in AS1141.

Table 1 – Typical Key Properties

Attribute	Unit	Typical Range for BFS
Bulk Density - Loose	t/m ³	1.20 - 1.30
Bulk Density - Compacted	t/m ³	1.30 - 1.40
Apparent Particle Density	t/m ³	2.75 - 2.85
Particle Density - SSD	t/m ³	2.55 - 2.65
Particle Density - Dry	t/m ³	2.45 - 2.55
Water Absorption	%	3.0 - 4.0
Material < 75mm	%	< 2
Material < 2mm	%	<0.2
Particle Shape - 2:1	%	10 - 15
Particle Shape	%	< 1
Wet Strength	%	90 - 110
Dry Strength	%	95 - 120
Wet/Dry Variation	%	10 - 20
Los Angeles Value		30 - 35
Sodium Sulfate Soundness	%	< 0.5
Light Particless	%	< 5
Weak Particles	%	< 0.5
Sugar		Nil
Iron Unsoundness		Free
Sulfate	%	< 0.2
Chlorides	%	< 0.01

PROPERTIES OF BLAST FURNACE SLAG CONCRETE

The properties of materials used to manufacture concrete are those in the previously described standard AS3582.2 for slag as a supplementary cementitious material, AS3972 for blended cements¹² and relevant provisions in AS2758.1, the Australian Standard for concrete aggregates¹. Generally, the use of slag aggregates and slag cements in concrete produces plastic properties similar to those resulting from natural aggregates and Portland cement alone. Concrete made with vesicular aggregates, such as slag aggregate, can be successfully pumped, placed and finished. It is, however, recommended that the lower density of slag aggregate is taken into account when designing concrete mixes to ensure that the volume of coarse material is not excessive.

The most commonly specified tests for concrete in projects are detailed in the various parts of AS10. Tests for concrete can be generally classified into three areas:-

- Plastic concrete properties,
- Concrete mechanical properties, typically up to 56 days age, and
- Long-term properties of concrete, typically mechanical properties in excess of 56 days age

The influence of blast furnace slag in concrete is considered in some detail for each of the areas mentioned above in Tables 1, 2 and 3 respectively. For each area, the specific influence of slag in concrete is described for each key concrete test parameter. Observations presented in Tables 1, 2 and 3 are general in nature. The Australasian (iron & steel) Slag Association (ASA) recommends that specific testing be conducted on slag binders and aggregates, other constituents and resulting concretes to verify properties in specific applications.

In many cases, slag enhances the hardened properties of concretes, generally improving and often surpassing those resulting from concrete made with natural aggregates and

Table 1 –Influence of Slag on Early Age Properties of Concrete

Concrete Parameter & Standard	Typical Influence of Slag Aggregate (BFS) in Concrete	Typical Influence of GGBFS in Concrete
Slump AS1012 Part 3	No effect if correct batching and moisture management procedures are in place	No significant effect when following sound mix design procedures
Air Content AS1012 Part 4	No significant effect when compared with good natural aggregate	No significant effect
Set Time AS1012 Part 18	No significant effect when compared with good natural aggregate	Works well with admixtures to achieve required initial and final set times
Density AS1012 Part 5	Can over-yield on equal mass replacement of good natural aggregate	Limited influence on density. Depends on replacement level
Comp. Strength AS1012 Part 9	Same influence as for good natural aggregates	Matched early age compressive strengths can be achieved through proper mix design
Heat of Hydration	May have slight reduction in temperature rise in concrete	Significantly lowered thus reducing the risk of thermal cracking

Table 2 – Influence of Slag on Mechanical Properties of Concrete (28 day to 56 day age)

Concrete Parameter & Standard	Typical Influence of Slag Aggregate (BFS) in Concrete	Typical Influence of GGBFS in Concrete
28 day Comp. Strength AS1012 Part 9	Same as for good natural aggregates	Can be used in high performance concretes (such as 100 MPa characteristic strength)
Indirect Tensile Strength AS1012 Part 10	Same as for good natural aggregates	Slight increase compared to Type GP cement
Flexural Strength AS10912 Part 11	Same as for good natural aggregates	Slight increase compared to Type GP cement
Hardened Density AS1012 Part 12	No significant influence when compared with good natural aggregate	Limited influence on density
Drying Shrinkage AS1012 Part 13	Can reduce drying when compared with inclusion of other aggregates	Can increase concrete drying shrinkage but this may relate to issues with the test method

Portland cement alone. In Table 2, a summary of the influence of slag binders and aggregates on typical hardened concrete properties are summarised.

The Association recommends that specific testing be conducted. The influence of slag on long-term properties of concrete is summarised in Table 3. High slag content concretes, particularly those containing blended cement with a high proportion of slag, produce high durability performance and are particularly useful for concrete structures in marine and saline environments. When properly used, blast furnace slag has the potential to improve concrete quality, particularly with slag blended cements. Correct cover, compaction and curing are all essential to ensure that the resultant hardened concrete will achieve the required design properties such as strength and durability. The same criteria apply equally to concrete containing natural aggregates and GP or other Portland cements.

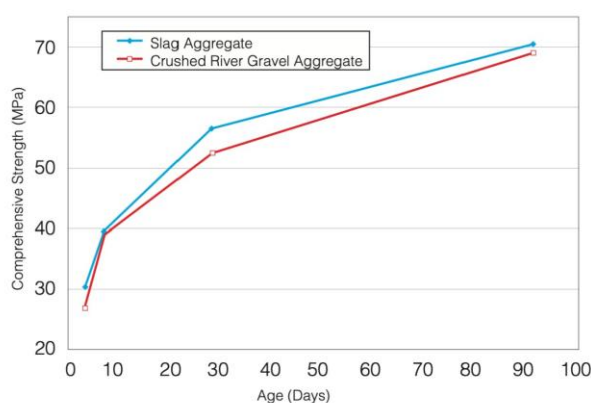


Figure 1. Compressive Strength versus Time

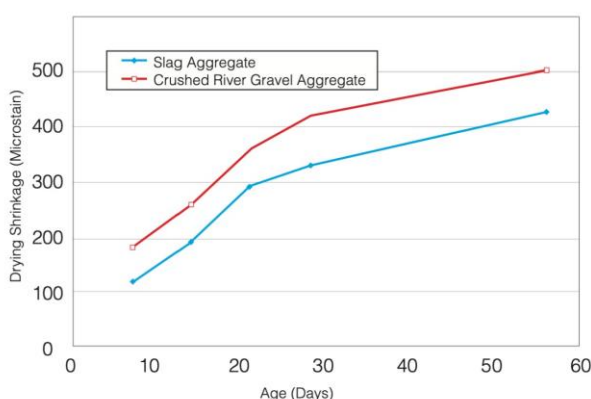


Figure 2. Drying Shrinkage versus Time

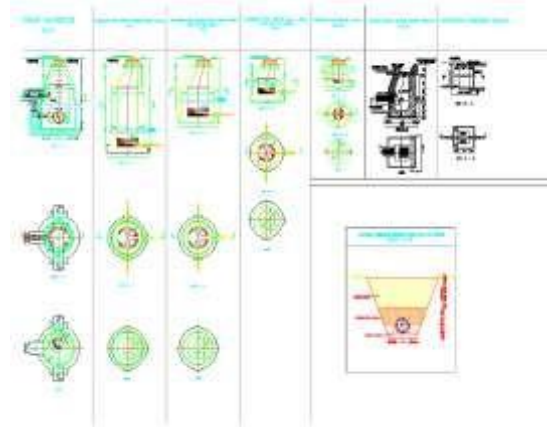
Project of survey

مشروع مساحة

• اهداف المشروع :

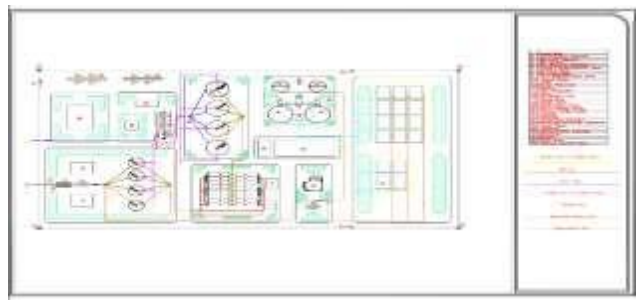
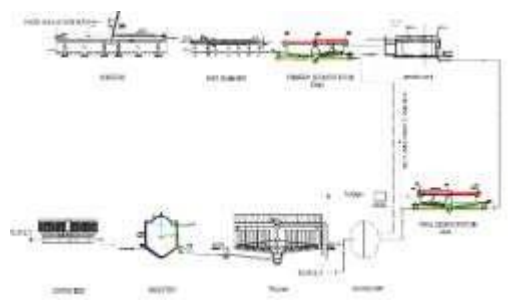
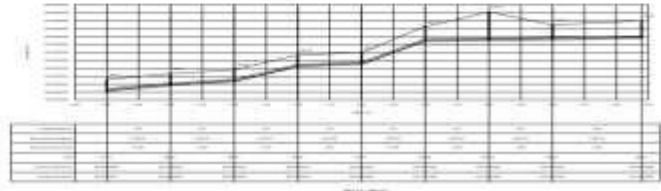
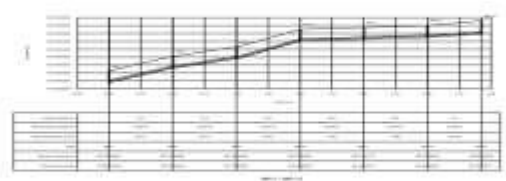
- 1- يهدف المشروع الى جعل المهندس الخريج قادر على العمل في التخصص المساحي وملائما لمتطلبات السوق حاليا.
- 2- يهدف المشروع الى جعل الطالب قادرا على الرفع المساحي بمختلف الطرق مثل الشريط والتبديوليت و التوتال ستيشن و أيضا تعرف الطالب على احدث الطرق مثل ال GPS و أيضا عمل ميزانية كاملة لموقع بواسطة الميزان.
- 3- أيضا يهدف المشروع الى جعل الطالب قادر على اخراج لوحات مساحية احترافية.
- 4- نعمل مع الطالب على معرفة الأخطاء المساحية التي يتعرض لها مهندس المساحة في سوق العمل مما يجعله محترفا في العمل المساحي.
- 5- يساعد المشروع الطالب على اكتساب صفة العمل الجماعي كمجموعة وهي صفة أساسية للعمل في سوق العمل.





Zone	Circle					475.6	599.2	700	800	900	1000	Rectangular	Total
	191.0	257.8	299.8	381.4	Metabol								
من 1.5	190	25	8	0	145	0	0	0	0	0	0	0	145
من 2.5-1.5	66	8	2	8	83	4	7	0	0	0	0	11	94
من 3.5-2.5	21	4	0	1	28	1	1	0	0	0	0	2	28
من 4.5-3.5	4	2	0	0	8	0	1	0	0	0	0	1	9
من 5.5-4.5	10	1	0	0	11	0	0	0	0	0	0	0	11
من 6.5	1	0	0	0	3	0	0	0	0	0	0	0	3

Zone	Circle										Rectangular	Total	
	152.8	191	237.8	296.6	380.4	475.6	599.2	700	800	900			1000
من 1.5	3975.6	668.2	628.8	0	0	0	0	0	0	0	0	0	0
من 2.5-1.5	1280.8	197.2	512.2	91	39.8	0	0	0	0	0	0	0	0
من 3.5-2.5	0	180	250	431.7	0	100	0	0	0	0	0	0	0
من 4.5-3.5	273.3	198.3	206.7	240	328	0	0	0	0	0	0	0	0
من 5.5-4.5	138	300	128.3	19.5	0	0	0	0	0	0	0	0	0
من 6.5	90	0	0	60	0	0	0	0	0	0	0	0	0



مشروع تصميم المنشآت الخرسانية المسلحة (2024-2025)

تعتبر مشاريع التخرج جزءاً هاماً من متطلبات الحصول على درجة البكالوريوس في الهندسة المدنية. يمثل هذا المشروع تنويجاً لسنوات الدراسة والتعلم، وفرصة للطلاب لتطبيق المعرفة النظرية التي اكتسبوها على مشاريع واقعية. وفي إيجاد مصادر موثوقة تساعدهم في إنجاز المشروع بنجاح. أهداف مشروع التخرج تتضمن:

- 1- تطبيق المعرفة والمهارات التي اكتسبها الطالب خلال دراسته في مجال محدد.
- 2- تطوير القدرات العلمية والعملية للطلاب وتنمية مهاراته في التحليل والتصميم والتنفيذ والتقييم.
- 3- حل مشكلة أو تحقيق هدف محدد في مجال الدراسة.
- 4- تطبيق المناهج والأساليب العلمية المعتمدة في المجال المختار.
- 5- تطوير المهارات الشخصية للطالب مثل القدرة على العمل الجماعي والاتصال وحل المشكلات. 6- تعزيز القدرة على إجراء البحوث العلمية وتوليد المعرفة الجديدة في المجال المختار. 7- إعداد الطالب للانتماء في سوق العمل وتأهيله لمواصلة التعليم العالي إذا رغب في ذلك

البرامج المستخدمة خلال اعداد المشروع

- 1- اعداد ملف كامل للمشروع باستخدام برنامج (Excel) -يقوم فيه الطالب بحساب الأحمال على الأعمدة للمنشأ الخرساني وايضا تصميم الأعمدة الخرسانية والأساسات ومقارنتها بالحل اليدوي للتأكد من النتائج
- 2- استخدام برنامج (WORD) لكتابة البحث الخاص بالمشروع كله
- 3- تصميم وتحليل انشائي لجميع اجزاء المنشأ من

(solid slab-flat slab-beam-frames-and any elements)

باستخدام بعض برامج التحليل الإنشائي مثال (SAP-ETABS-SAFE) ومقارنته بالتصميم اليدوي

- 4- عمل نمذجة كاملة للمنشآت باستخدام (BIM) برنامج (Revit) لتكوين نموذج كامل للمشروع -وفيه يتم حساب كميات المشروع كله من خرسانة مسلحة وكمية حديد التسليح

- 5- رسم جميع المسافات الإنشائية للمشروع وتفصيل القطاعات الخرسانية المسلحة والمسافات التنفيذية للمشروع باستخدام برنامج

(AutoCAD)

المشرف على المشروع

د/خالد عبده ابو الفتوح احمد

Construction Management Project

Objectives of the Project

This project holds significant importance as it demonstrates the practical application of construction management principles in a real-world scenario. By integrating traditional methods with modern software tools like Revit and Primavera, we were able to enhance the efficiency and accuracy of the construction process. The project also highlights the importance of careful planning, cost control, and time management in ensuring the successful completion of construction projects.



Furthermore, this project serves as a valuable learning experience, providing insights into the challenges and complexities of construction management. It also underscores the importance of collaboration between the owner, consultant, and construction team in achieving project objectives.

The primary objective of this project is to demonstrate the application of construction management principles and techniques in the real-world context. Specifically, the project aims to:

1. **Quantity Surveying**: Conduct a thorough quantity survey to determine the quantities of materials and labor required for each task in the project. This is done both manually and using Revit software to compare the efficiency and accuracy of both methods.
2. **Cost Estimation**: Provide a detailed cost estimate for each item in the project, ensuring that the budget is carefully managed and resources are allocated efficiently.
3. **Time Scheduling**: Create a comprehensive time schedule using Primavera software to ensure the project is completed within the stipulated timeframe.
4. **Construction Management**: Oversee the entire construction process, ensuring that all activities are executed according to the plan, and addressing any challenges that arise during the project lifecycle.

new giza university hospital

المساحة الاجمالية للمبني
7.212m²

رؤية المشروع وهدفه

يهدف المشروع إلى إنشاء مجمع صحي حديث يجمع بين التعليم الطبي، رعاية المرضى، والخدمات الطبية المتقدمة.



المرافق الرئيسييه

1. المستشفى التعليمي العام

- المساحة البنائية الإجمالية: حوالي 22,400 م²
- الطاقة الاستيعابية: 168 سريرًا
- عدد الطوابق:

 - بدروم
 - الطابق الأرضي
 - طابقان علويان
 - غرف على السطح