

SEJ201 Structural Design**Assessment Task 3****PROJECT DESIGN BRIEF****Summary**

The Project Design Brief consists in a team report detailing the preparatory structural analysis tasks for the design proposal to be submitted at the end of the trimester. The report shall clearly identify project scope, inputs and constraints, assumptions, detailed loads, support reactions and critical design elements. The submission shall also include a Team Charter.

This is a group assessment task, however, individual students must provide regular evidence of contribution and are required to provide self and peer reviews of team member contributions via the designated online portal. In this document, the Assessment Task requirements and the Assessment Task Rubric are described in detail.

Contents

1	Introduction and Objectives	2
2	What you need to submit	2
3	Report: Task Requirements Summary	2
4	Report: Task Requirements Details	3
4.1	Project Introduction	3
4.2	Design Loads Summary	3
4.3	Preliminary Analysis & Design tasks	3
4.4	Concept Sketches & Drawing Schedule	5
4.5	Team Charter	5
5	Report: Format Requirements.....	6
6	Self and Peer Assessment: Task Requirements.....	7
7	Rubric.....	8

1 Introduction and Objectives

This assignment is designed to assess your understanding of the structural project tasks for SEJ201 and your performance of some preparatory structural analysis tasks for the project. This Assessment Task is designed to assess the following Unit Learning Outcomes:

- ULO 1.** *Apply* structural engineering *fundamental knowledge* in conjunction with *appropriate tools and resources* to analyse and design elements to satisfy user requirements.
- ULO 2.** *Apply* specialised structural knowledge, technical competence and open-ended problem-solving skills in finding appropriate creative and/or innovative engineering solutions
- ULO 3.** *Identify* and *characterise* important issues, *justify* and *apply* appropriate *simplifying assumptions* and propose substantiated solutions.
- ULO 4.** *Collaborate* with others as an *effective* member of an engineering team and reflect on development of team skills.
- ULO 5.** *Communicate* project outcomes through the use of oral, *written and graphical* communication to professional and non-professional audiences.

The Project Design Brief requires each student to contribute to early-stage analysis tasks in order to establish a conceptual stage briefing document. This is a group task which requires all members of the team to contribute to prepare for the individual assessment items later in trimester. This document will help prepare each student for the Assessment 4 and 5 tasks later in the trimester (you will use the results from this Assignment) and therefore, it is advised that all students obtain a good understanding of ALL the tasks involved.

Teamwork is often challenging but it is also an essential component of your future engineering careers. To help you develop your team working skills, you are required to identify some techniques which might improve your teamwork experience and try these out during trimester, as well as self- and peer-assess your team members contributions.

2 What you need to submit

- * **Teams** must submit a report (Project Design Brief) as a **single file** via the Unit Site to the respective assignment folder by the due date. Submissions must contain original work generated only by members of the team for the purposes of the report.
- * **Individual students** must submit **self- and peer-reviews** of team members via the designated online portal. Peer reviews will be considered during grading of submission, individual results may be modified for those team members who have failed to contribute effectively.

3 Report: Task Requirements Summary

The Project Design Brief shall detail the preparatory work completed on the structural design project for this unit. A list of the tasks to be addressed in the submission is as follows:

- 1) Introduction
- 2) Design Loads Summary
- 3) Preliminary Analysis & Design tasks (nominated structural elements)
- 4) Concept Sketches & Drawing List
- 5) Team Charter

4 Report: Task Requirements Details

The requirements for each individual task listed in Section 3 is provided in the following subsections to guide students. Students should also refer to the Assessment Rubric in Section 7 for further details on the assessment criteria for these tasks.

4.1 Project Introduction (max 500 words)

The reader should clearly understand the proposed scope of work from this document. Provide a concise introduction, which clearly explains the scope of the project work **and** identifies: exclusions, input documentation, constraints, and identifies and justifies relevant assumptions.

4.2 Design Loads Summary (max 3 pages)

Provide a concise summary of all relevant actions on the structure, including *dead*, *live* and *lateral* actions in accordance with the Project documentation.

Note: The loads summary will be used during each analysis task and should be prepared with care and presented in a useful format, using appropriate *notation* and *units* (include steps to calculate loads, when applicable).

4.3 Preliminary Analysis & Design tasks

4.3.1 Support Reactions

Reactions shall be determined for the supports and loads nominated in Table 1. Refer to for support locations.

Calculations for each item shall be provided and shall detail the full solution procedure with clear sketches to explain the calculation procedure.

Typically, the determination of reactions for each element shall include the following steps:

1. Calculation of loads acting on member being analysed;
2. A free body diagram (FBD) showing all members and reactions, loads and dimensions;
3. Calculation of support reactions for relevant loads;
4. Summary of results (i.e. tabulated).

Table 1. Support Reactions required and Load Cases.

Support Reactions	Load Case			
	$\sum G$	$\sum Q$	W_U	Notes
Deck Cross Beams	✓	✓	-	<i>Protected from Wind Load</i>
Pin Support A (Backstay)	✓	✓	✓	-
Pin Support B	✓	✓	✓	<i>Include reactions from Main Girders and A-Frame, exclude south approach ramp</i>
Pin Support C	✓	✓	✓	<i>Include reactions from North Approach Ramp</i>

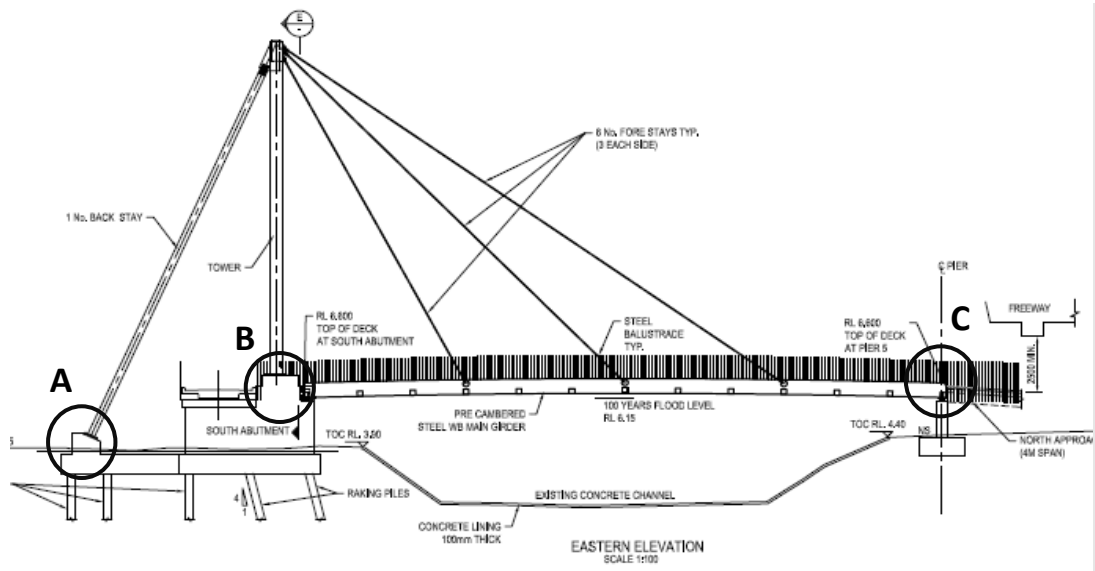


Figure 1. Pin Support locations (refer to DWG 201-022-S004).

4.3.2 Structural Analysis & Design

Structural analysis (internal actions) and design tasks are required for the following structural elements:

North Pad Footing (analysis and design):

Determine pad footing dimensions so that footing satisfies performance requirements for bearing & stability. Factor of Safety is required. Appropriate loading and combination load cases shall be applied, with suitable justification provided.

Longitudinal Frame Analysis:

Analyse a simplified 2D frame model of the entire structure to determine support reactions and internal axial forces for specific load cases. Calculations using simple statics and truss analysis techniques shall be used to complete this task.

The simplified model shall use symmetry to model either the eastern or western half of the structure, and shall include the Main Girder, three support cables, the A-Frame support and backstay.

A-Frame Analysis:

Analyse a simplified 2D frame model of the A-frame Vertical Support structure to determine internal actions for specific load cases. Calculations using simple statics and truss analysis techniques shall be used to complete this task. Results from previous analyses will be required as inputs.

4.4 Concept Sketches & Drawing Schedule

Provide concept sketches which summarise the design proposal. Drawings may be hand drawn, produced with drafting software (encouraged), but must include all *critical items, members, dimensions* and *constraints* for the next design stage. The sketches must be printed in A3 size with a standard title block which contains:

- * Project name & Team name;
- * Drawing number, title, revision number and date;
- * Prepared By & Date;
- * Approved For, By and Date;

A *drawing schedule* must be provided which lists the proposed drawing deliverables for the next stage. The list shall include Drawing Numbers, Titles and a brief description of the purpose of each drawing proposed.

Note: you can use the project drawings from earlier preliminary design stages as a starting point.

4.5 Team Charter

The Team Charter section of the report shall include the following items:

- * Team name: Choose a team name that is appropriate, businesslike and professional in title and meaning. Ensure that is not offensive directly or indirectly (consider GLO 8) and it must be unique within the class.
- * Team members: List the full name of each member as shown in DeakinSync, with surname first (in capitals), then other names, e.g. PAULINO, Mariana. Include the Student IDs of all members.
- * Role and responsibilities: List each student's role and responsibilities according to the Belbin Team Role Descriptions. Make sure to clearly state who the team leader is. A table or chart may be a useful means of documenting the assigned roles in the team.
- * Team resources: Identify and briefly list any specific knowledge, skills, capabilities that each team member provide. For example, expertise in 3D CAD, relevant work experience (or current occupation).
- * Team management: Describe team management intended for the project such as the following aspects:
 - Will the leadership role rotate amongst the team or stay with the same member throughout?
 - How will the team members communicate? Will there be weekly meeting outside unit contact hours?
 - Have team roles been assigned with narrow or broad scope?
 - How will disagreements within the team be resolved? e.g. will it be resolved by leader's decision or through an agreed upon dispute resolution process?
 - How will team member involvement and contribution be monitored and managed? What procedures and processes will be used and who will perform these management functions in the team. For example, will monitoring of individual team members include monitoring and assessment of: attendance to team meetings, availability and responsiveness to team communications and requests, punctuality and completeness of contributions, reliability with assigned actions and tasks
 - How will team discipline be performed? e.g how will non-performance a member be addressed by the team?
- * Team commitment: As the last page of this design brief provide a signature page with the date and the signature of each team member. By signing the team commitment statement all team members are verifying their commitment to the project. The recommended team commitment statement is:

I certify that I have actively participated in the development and production of this Design Brief document and that I will be an actively significant and supportive contributing member of this team at all times and throughout the project.

5 Report: Format Requirements

The report shall include clear and concise calculations, scale sketches and concise written sections as required. Your report must be submitted as a *single file* in one of two formats: *MS Word* or *PDF* (additional files submitted to the assignment folder may not be assessed). Your report must include:

Cover Page

On the first page of the submission, teams must include the following items:

- * Unit code and title
- * The title of the assignment
- * Team name
- * Names & ID of each team member

Calculations

Students must use word processing software to create written sections of the main body of the report, including all relevant formulas and results. Students should use adequate equation editors for writing mathematical formulas. Handwritten calculations can be included only as additional resources (appendices) and may not be assessed.

Solutions

Solutions should be clearly identified (e.g. underline answers in calculations) and the steps followed to obtain these solutions, including any geometrical calculations, formulas used and citations to sources.

Units

Students shall ensure that they use appropriate significant figures and SI units at all times.

Sketches

Hand-drawn sketches are allowed and encouraged; however, students must ensure these are clear and scanned with high-quality. Poor and/or unprofessional-looking images may not be assessed. Examples of poor images include pictures taken with mobile phones, where shades compromise quality of the content.

Free Body Diagrams and similar diagrams must include all relevant information (including appropriate labels).

Sources/References

Sources used should be cited in place and full references should be listed at the end of your report in an appropriate section (see [Deakin Guide to Referencing](#) for guidelines). Lecture slides, recording, and YouTube videos (or similar) do not require referencing. Information taken from manuals, tables, books, etc, must always be referred to.

You can use your preferred referencing style, provided you use it consistently throughout your report.

Technical Drawings

Technical drawings can be hand-drawn or created using CAD software; in both cases, these must be included as part of your report, and not as a separate document, and should be size A3.

Formatting

Your report should be presented in a clean and professional format (e.g. page numbering, table of contents, captions, etc). You are encouraged to follow the layout of templates, if provided, but not required to.

6 Self and Peer Assessment: Task Requirements

To help you develop your team working skills, you are required to identify some techniques which might improve your teamwork experience. The purpose of this task is to reflect on your team's performance, and your own performance within the team.

You must individually complete the self- and peer- assessment through FeedbackFruits™ (FBF) Assessment Task which is due within 48 hours of the report. You will assess six criteria within three categories:

Working with others

1. Contributed to the Project Design Brief.
2. Listens and allows others to share their ideas.
3. Is respectful of others ideas.

Contribution

4. Provides useful ideas.
5. Participates in team discussions. (verbal, electronics etc.)
6. Completes the task they commit to.

Focus on task

7. Punctual to all team's tasks and meetings.
8. Self-motivated and worked within the team charter.
9. Uses team time wisely.

You must also provide meaningful and constructive comments that allow your team members to reflect and/or improve their contribution towards future Assessment Tasks.

Note that submission of Peer Reviews is a **requirement for this assessment task**. The outcomes from the peer evaluation that you receive will be used for formative and **summative** purposes. The results from this task will be used to adjust your *Individual Assessment Task Score* based on the team mark. The calculation will be based on whether or not you have completed the *Self- and Peer-Assessment task* and the Group Skills Factor (GSF) achieved according to the details provided in Table 2 below.

Guidelines for submission FeedbackFruits™ (FBF) tasks are detailed in the Unit Site Assessment module.

Table 2. Details of the summative assessment associated with the FeedbackFruits task for each (individual) student.

Criteria	Calculation for score that Individual will achieve for Assessment Task 3 **
FBF task completed and GSF \geq 0.8	Individual score = Team Project Design Brief score <i>This means that you will achieve the maximum mark of the team.</i>
FBF task completed and GSF < 0.8	Individual score = Team Project Design Brief score \times GSF <i>This means that your team's view of your performance can reduce your individual mark.</i>
FBF task <u>not</u> completed and GSF \geq 0.8	Individual score = Team Project Design Brief score – 25% penalty <i>This means that your score will be deducted by 25% of the total value of this Assessment Task.</i>
FBF task <u>not</u> completed and GSF < 0.8	Individual score = Team Project Design Brief score \times GSF – 25% penalty <i>This means that your score will be deducted by 25% of the total value of this Assessment Task, and your team's view of your performance can reduce your individual mark further.</i>

** The unit chair can also choose to use their discretion when adjusting the marks due to the GSF scores.

7 Rubric

Criteria	Weight	Exemplar	Very Good	Good	Satisfactory	Not Satisfactory
Communication - Introduction & Report writing	10%	Extremely well-written and structured report which allows the reader to clearly understand the intended scope for the project. Concise and accurate introduction to the project which clearly addresses exclusions and constraints and clearly explains and justifies design assumptions .	Well-written and structured report which allows the reader to understand the intended scope for the project. Very good introduction to the project which addresses exclusions, constraints and design assumptions.	Mostly well written and structured report which allows the reader to understand most of the project scope. Introduction to the report addresses most exclusions, constraints and assumptions.	Report has issues that may include spelling or grammatical errors or structure. Introduction provides a basic description of the project which allows the reader to gain a basic understanding of the project scope, but misses some important exclusions, constraints and / or assumptions.	Extremely poor-quality report which does not allow the reader to understand the scope of the project. Introduction does not describe the project scope adequately, nor address exclusions, constraints, or assumptions.
Design Loads Summary	20%	Concise loading summary accurately presents all relevant loading in appropriate units , with standard notation and in a user-friendly format . Loading and load cases are strictly in accordance with Basis of Design documents.	Loading summary accurately presents all relevant loading in appropriate units and notation and in a useful format. Loading and load cases are mostly aligned with Basis of Design documents.	Loading summary presents most loads in appropriate units, but with minor issues in accuracy, notation and / or format. Load cases are mostly aligned with the Basis of Design documents.	Loading summary includes most loads, but with issues in accuracy, units, notation or format. Load cases are included but with some exemptions from the Basis of Design documents.	Loading summary not included or does not include appropriate loads. Significant issues in accuracy, units, notation and / or format. Load cases not included or not in accordance with the Basis of Design documents.
Structural Analysis (for nominated structural members)	40%	Accurate analysis complete for nominated structural elements, presented in appropriate units. Professional documentation of calculation process, inputs , outcomes , explanations and sketches .	Analysis completed for all nominated structural elements to relevant level of accuracy and in appropriate units. Very good documentation of calculation process, inputs, outcomes, explanations and helpful sketches.	Has completed analysis for all nominated structural elements, but with some minor errors. Calculations are provided, but are without appropriate outcomes, explanations or sketches in some places.	Has completed analysis for all nominated structural elements, but with some notable errors or inappropriate units. Calculations are provided, but are difficult to follow in some places and / or without appropriate outcomes or explanations or sketches not provided in some areas.	Has NOT completed appropriate analysis for nominated structural elements, or contains significant errors. The calculations provided are difficult to follow and without appropriate outcomes, explanations or sketches.
Structural Design (for nominated structural members)	5%	Appropriate size proposed is efficient AND satisfies performance requirements . Critical actions, load cases and sources of data are stated clearly. Factors of Safety and checks are accurate and concise .	Size proposed satisfies performance requirements, but with some inefficiencies. Critical actions, load cases and sources of data are stated clearly. Factors of Safety and Deflection checks for each member are provided with only minor errors.	Size proposed, but inefficient and / or minor issues with satisfying performance requirements. Critical actions, load cases and sources of data are stated, with only minor exceptions. Factors of Safety and checks provided but with some error.	Size proposed, but inappropriate in some aspects or not entirely satisfying requirements. Critical actions, load cases and sources of data are stated, but with notable exceptions. Factors of Safety and checks provided but with some error or notable exceptions.	Structural element NOT proposed, or NOT satisfying requirements. Critical actions, load cases and sources of data are not stated or with significant error. Factors of Safety and / or checks not provided or with significant error.
Team Charter & Peer Assessment	15%	Clearly articulated and professionally presented Team Charter Agreement. Team charter provides guidance and resolution procedures for all team coordination issues . Has provided meaningful and constructive comments in FeedbackFruits for all team members. (individually assessed)	Very good Team Charter Agreement. Team Charter provides guidance and resolution procedures for most team coordination issues. Has provided meaningful comments in FeedbackFruits for all team members. (individually assessed)	Good Team Charter Agreement. Team Charter provides some useful guidance on how team members might contribute effectively to the team and resolve some issues. Has provided some meaningful comments in FeedbackFruits for all team members. (individually assessed)	Basic Team Charter agreement. Team Charter provides little useful guidance on how team members might contribute effectively to the team and resolve some issues. Has provided some relevant comments in FeedbackFruits for all team members. (individually assessed)	Team Charter Agreement NOT provided, or not detailed enough to assist team in functioning effectively. Comments provided in FeedbackFruits for remaining team members are not relevant/helpful. (individually assessed)
Communication: Drawings	10%	Excellent concept sketches for proposal, upon which all critical items, members and dimensions for next design stage are identified. Drawing list/schedule provided for next design phase, complete with reference number and purpose for each drawing.	Excellent concept sketches for proposal, upon which most critical items, members and / or dimensions for next design stage are identified. Drawing list provided for next design phase, complete with reference number and purpose for each drawing.	Good concept sketches that identify most design members, constraints and dimensions, with minor errors / omissions. Drawing list provided with sufficient detail.	Concept sketches provided identify most design members, constraints and dimensions, but are not well presented or contain significant errors. Basic drawing list provided.	Very poor-quality sketches provided and/or not provided at all. Significant concept information for next design phase is missing and / or incorrect. Drawing list for next phase is poor / not provided.