





HYPERLOOP DEVELOPMENT **COMPETITION SPECIFICATION**

TECHNICAL DESIGN REPORT WRITING GUIDE

2024











TEKNOFEST AEROSPACE AND TECHNOLOGY FESTIVAL

HYPERLOOP DEVELOPMENT COMPETITION

TECHNICAL DESIGN REPORT WRITING GUIDE

TEAM NAME

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1. INTRODUCTION

This writing rules are prepared to ensure unity in the writing of the Technical Design Report to be created by the teams participating in the Hyperloop Development Competition. The Technical Design Report should be prepared and written according to the sample rules specified in this guide. This report writing guide regulates the format of the reports to be written by the teams participating in the Hyperloop Development Competition, and includes examples or templates for report writing.

Teams preparing the Technical Design Report must adhere to the rules attempted to be expressed in broad outline in this booklet. Technical Design Reports that are not prepared and written in accordance with the stated rules are not accepted.

1.1. Basic Information

- The "Similarity Rate" of the Technical Design Report should not exceed 20%, excluding quotations, references, and titles.
- It is not appropriate to quote in paragraphs copied and pasted from other sources.
 The total of such quotes throughout the report should not exceed 1 page. If the total exceeds 1 page in the copy-paste format, the Technical Design Report will not be accepted.
- Every quote made should be referred to the source (citation) and the source display should be carried out by paying attention to the explanations specified in the References section.
- Up to 5% of the figures can be taken, provided that a reference is made from another source. The remaining figures should consist of explanation and result figures drawn by team members themselves.
- Reports delivered in PDF format will be checked by the Advisory and Evaluation Board (AEB/DDK) (preliminary evaluation), reports that do not comply with writing rules and have not met the necessary delivery conditions will not be accepted.
- Reports that have been arranged according to this guide and passed the preliminary assessment phase are subjected to a detailed assessment phase by the AEB. The relevant Hyperloop Development Compettion rules apply to reports that cannot pass the preliminary assessment.

2. GENERAL WRITING RULES

2.1. Page Layout

In the text, there should be a 2.5 cm space on the right edge of the page, 2.5 cm on the left edge, and 2.5 cm on the bottom and top edges. Words should not be split at the end of the line and at the last line of the page.

2.2. Font Type and Size

The Technical Design Report should be written on a computer. The font "Arial" should be selected in the text and it should be "12 point". Italic font style should be preferred only for special emphasis, mathematical expressions, technical terms, foreign words, etc. All special signs and symbols should be written on the computer. Bold letters should be used when emphasis is desired in headings and within the text. There should be a space after punctuation marks such as period and comma.

2.3. Line Spacing and Text/Paragraph Layout

The entire text should be written with a line spacing of 1.15 and Table and Figure titles, Footnotes, References, and Appendices should be written with single line spacing. There should be a line of space left between Table and Figure titles and Tables and Figures. Indents should not be used in paragraphs. The text should be justified on both sides of the page. The format of spaces between paragraphs should be first 0 nk then 6 nk.

2.4. Main Section Headers

Numbering should start from the first line of a new page for main section headings, and after writing in 12 point bold font style in uppercase, the text should be continued without leaving a paragraph space or a subheading should be written. There should be a line space with 1.15 line spacing between two subheadings.

2.5. Subheadings

All subheadings and classification numbers should be written in bold type style characters. In subheadings, the first letter of each word should be capitalized. In the text, there should be a line space with a 1.15 line interval between the subheadings and the upper text. If the subheading comes at the end of the page, there should be at least two lines of text following the subheading. If this condition is not met, the subheading should be arranged to be on the new page. Care should be taken to keep all main and subheading names as short and concise as possible. A classification number should be given to all main and subheadings. The numbering of the title starts from the paragraph, the number is written, a point is put, a letter space is given, and then the title is written.

2.6. Page Numbering

Except for the first page of the report, all pages of the report should be numbered. Page numbers should be written at the bottom right corner of the page. No marks such

as lines or brackets should be used next to the page numbers, and their size should be 12 points, and their character should be the same as that in the text.

The front pages should be numbered with small Roman numerals starting from the "CONTENTS" section to the "1. APPLICATION NUMBER, TEAM NAME, CURRENT LIST CONTAINING INFORMATION OF TEAM MEMBERS AND ADVISORS" section. The text pages should be numbered continuously from the "1. APPLICATION NUMBER, TEAM NAME, CURRENT LIST CONTAINING INFORMATION OF TEAM MEMBERS AND ADVISORS" section to the last page of the "REFERENCES" and if available, the "APPENDICES" in the form of 1, 2, 3, 4, 5,

2.7. Figures

Graphics, diagrams, maps, photographs, images etc. are referred to as "figures". Figures should be used in the report to assist in the narrative. Figures should be prepared in a computer environment and should be easily visible and readable in size and clarity: The resolution of the figures to be used in the report should be high. Blurry, foggy, scattered figures and figures with images and writings mixed with each other should definitely not be used.

- Light color axis and graph line should not be used, instead dark color line should be preferred.
- The background color in the graphs should be as white as possible, the lines should be dark.
- It should be written on the figure what the x and y axes represent and their units, if any.
- Figure lines should be distinctive and clear, the type and size of the font used should be compatible with the one used in the text. Everything on the figure should be easily readable.
- In the text, it should be explained what they mean by referring to the figures.

2.8. Placement of Figures

Figures should be placed where they are mentioned in the report text or on the next page. All figures in the report must be cited in the report text. Figures should be centered on the page and should not overflow the page margins. In necessary cases, large figures can be placed horizontally on the page.

A space of 1.15 line spacing should be left between two figures or a figure and a table to be placed on the same page, and between text and a figure. A single line space should be left between the figure and the figure caption. A 1.15 line space should be left between the figure caption and the normal text portion. The line spacing of the figure caption should be arranged as one line.

The figure number and figure caption should be written in 12 point size. The figure caption should be arranged in a way that starts with a capital letter for the first word, and lower case for the initial letters of the other words, placed after the figure number

with a dot and a character space left. Bold type style should be selected for the figure number, and normal type style for the figure caption. The caption under the figure should be centered horizontally on the page.

When numbering figures, the first number should be the main section number where the figure is located in the text, and the second number should be the order number within the main section. For example; the first figure of the 6th main section should be written as "Figure 6.1.". Figures in the appendix section should be numbered as "Figure E1.1.", "Figure E1.2.", etc.

2.9. Photos

Photos of the individuals within the scope of the study should be used in accordance with ethical principles and individual rights: The photos used should belong to the study being conducted and should not be used without written permission from the photo owner if they belong to someone else.

- The resolution of the photos to be used in the report should be high, photos should be contrast and clear enough to see the details.
- Blurry, messy, foggy, images and texts that have merged into each other should not be used.

Photos should be numbered as in figures: Continue with figure numbers in the form of "Figure 1.1.", "Figure 1.2."..., and assign numbers to the photos. It should clearly indicate what it represents by referring to every photo used in the text.

2.10. Tables

Tables should be created in a computer environment and the words, numbers, symbols, abbreviations etc. in the table content should be arranged in a clear, visible and understandable manner.

2.11. Placement of Tables

Tables within the text should be placed as close as possible to where they are mentioned for the first time. Tables with narrow column content should be centered and narrowed according to the content: Empty and wide column format should not be used. The width of the table should be arranged with the content, not with the tables.

There should be a 1.15 line spacing gap between two tables or a table and a figure to be placed on the same page, and between the text and the table. There should be a 1 line spacing gap between the table and the table title. The table title line spacing should be arranged to be 1 line.

The table number and table title text should be written in 12 point size. The table title text should be arranged so that it follows the table number, with a period and a character space left, the first letter of the first word capitalized, and the first letters of the other words beginning with lowercase. Bold type style should be selected for the

table number and normal type style for the table title text. The table title text should be horizontally centered on the page.

When numbering the tables, the first digit should represent the main section number in which the table is located in the text, and the second digit should represent its order number within the main section. For example; The first table of the 6th main section should be written as "Table 6.1.". Tables in the appendices are numbered as "Table E1.1.", "Table E1.2.", etc.

2.12. Equations

Equations, Equalities, Equivalences and Formulas should be created using an "equation editor" and should be added to the report text. Equations should be considered as part of the text and the sentence before the equation should end with a comma/semicolon.

- Equations should be written with a 1.15 line spacing and left-aligned.
- There should be a space of 1 line interval above and below between equations and texts.
- When numbering the equation, the first digit should be the main section number where the equation is located in the text, and the second digit should be arranged as the number of places within the main section. For example; the 1st equation of the 6th main section should be written as "(6.1)". Equations in appendices are numbered as "(E.1.1)", "(E.1.2)".
- The equation number should be written at the far right of the line where the relevant equation is located.
- Necessary explanation related to the relevant equation should be given by referring to the equations in the text.
- The usage of the equation in the text; the first letter of the word equation should be uppercase, and the numbers should be in parentheses. For example; Equation (6.1).

2.13. References

All information resources (thesis, article, presentation, report, book, law, regulation, standard, patent, web page, etc.) used in report writing should be included in the list of references. But unpublished lecture notes, presentations, articles, etc. should not be cited as a source. Publications not cited within the report text should not be included in the reference list.

When a section from another source is wanted to be transferred exactly as quoted (in quotation marks and with citation) in the report, its formal application varies depending on the length of the quote. Quotes of less than forty words are shown in quotation marks, while quotes of more than forty words should be written as a separate paragraph from the main text, with boundaries 1.5 cm within the right and left, reducing

the font size by 2 points from the text font size, and should be written with 1 line spacing. No complete paragraph should be quoted from any source.

The information used in report writing should be internalized by the author and incorporated into the report with the author's unique narrative style and own expressions. Even if the expression/form changes, the information fundamentally belongs to someone else and therefore it is essential to refer to the source of information (citation) within the report text. Care should be taken to adhere to ethical rules when citing and plagiarism should not be committed. In the report, referring to the source of information (citation) should be done as "showing the source within the text".

References in the report text should generally be displayed at the end of the relevant sentence and where necessary within the sentence in the appropriate place, in square brackets, by assigning a number to each one in order of transition. If more than one source is to be referenced in the same sentence, the order of citation should be from smallest to largest according to the citation number, with sources separated by commas within the same square brackets. For example; [1, 4, 5, 6, 7]. If the sources cited have a continuous sequence number feature, only the dash sign (short line) should be used between the first and last source numbers. For example; [6-11].

In the References List, the font in the text should be selected as "Arial" and should be "10 point" and should be written with single line spacing. There should be 6 point space between two consecutive sources. Example source writing styles are given below:

Single Author Article

[1] C. O. Colpan, "Exergy Analysis of an Integrated Two-Stage Biomass Gasifier and Solid Oxide Fuel Cell system", *International Journal of Exergy*, vol.10, no.1, pp. 61-76, 2012.

Article with Two Authors

[2] M. Ceylan and A. Balikci, "A Temperature Dependent Model for LTO/NMC Batteries", ECS *Transactions*, vol. 95, no. 1, pp. 113-120, 2019.

Article with Three Authors

- [3] M. A. Cimen, O. Ararat and M. T. Soylemez, "A New Adaptive Slip-Slide Control System for Railway Vehicles", *Mechanical Systems and Signal Processing*, vol. 111, pp. 265-284, 2018.
- [4] B. Piskin, C. S. Uygur and M. K. Aydınol, "Morphology Effect on Electrochemical Properties of Doped (W and Mo) 622NMC, 111NMC, and 226NMC Cathode Materials", *International Journal of Hydrogen Energy*, vol. 45, no. 14, pp. 7874-7880, 2020.

Article with Four or More Authors

- [5] M. Luy, V. Ates, N. Barisci, et al, "Short-Term Fuzzy Load Forecasting Model Using Genetic-Fuzzy and Ant Colony-Fuzzy Knowledge Base Optimization", *Applied Sciences*, vol. 8, no. 6, pp.1-30, 2018
- [6] E. Okumus, F. G. Boyaci San, O. Okur, et al, "Development of Boron-Based Hydrogen and Fuel Cell System for Small Unmanned Aerial Vehicle", *International Journal of Hydrogen Energy*, vol. 42, no. 4, pp. 2691-2697, 2017.

Single Author Presentation

[7] H.Ş. Bilge, "Ultrasonik Görüntüleme için bir Uyarlanır Histogram Denkleştirme Yöntemi", 10. Sinyal İşleme ve İletişim Uygulamaları Kurultayı, Pamukkale, Denizli, Türkiye, 12-14 Haziran 2002, s. 1145-1150.

Presentation with Two Authors

[8] C. Seker and M. T. Güneser, "Design and simulation of 26 GHz patch antenna for 5G mobile handset," 11th International Conference on Electrical and Electronics Engineering (ELECO), Bursa, Turkey, 28-30 November 2019, pp. 676-678.

Presentation with Three Authors

[9] M. Sekkeli, C. Yildiz and H. R. Ozcelik, "Fuzzy Logic Based Intelligent Speed Control of Induction Motor Using Experimental Approach", International Symposium on Innovations in Intelligent Systems and Applications (INISTA) 2009, Trabzon, Turkey, 29 June - 01 July 2009, pp. 151-155.

Presentation with Four or More Authors

[10] M. Deniz, B. Gultekin, C. O. Gercek, et al, "A New DC Voltage Balancing Method for Cascaded Multilevel Inverter Based STATCOM", 2007 International Aegean Conference on Electrical Machines and Power Electronics, Bodrum, Turkey, 10-12 Sept. 2007, pp. 532-535.

Book

[11] A. Sürmen, M. İ. Karamangil ve A. Ridvan, Motor Termodinamiği, Aktüel, 2019.

Book Chapter

[12] A. F. Zobaa, S. H.E. Abdel Aleem and M. E. Balci, Introduction Chapter: Power System Harmonics-Analysis, Effects, and Mitigation Solutions for Power Quality Improvement, Power System Harmonics-Analysis, Effects and Mitigation Solutions for Power Quality Improvement, IntechOpen, 30 May 2018.

Thesis

- [13] T. Kaya, "Experimental Combustion Analysis of Diesel Engine", PhD Thesis, İstanbul Teknik Üniversitesi, İstanbul, Turkey, June 2019.
- [14] O. Kütük, "Rüzgar Türbinleri için Doğrudan Sürüşlü Sürekli Mıknatıslı Senkron Generatör Tasarımı", Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi, İstanbul, Türkiye, Haziran 2011.

Report

- [15] IEA (2020), Global EV Outlook 2020, IEA, Paris https://www.iea.org/reports/global-ev-outlook-2020
- [16] C. McKerracher, A. Izadi-Najafabadi, A. O'Donovan, et al, Electric Vehicle Outlook 2020, BNEF, 2020.

Web Page

[17] Renewables 2020 Global Status Report, REN21, https://www.ren21.net/wp-content/uploads/2019/05/gsr_2020_full_report_en.pdf (Ziyaret tarihi: 19 Temmuz 2020).

Patent

[18] M. Antonietti, M. M. Titirici and R. Demir-Cakan, "Process for the Preparation of Hydrothermal Hybrid Material from Biomass and Hydrothermal Hydrid Material Obtainable by the Process", World Patent, (WO/2010/006881), 2010.

Standard

[19] TS EN 50620/A1, Elektrik Kabloları - Elektrikli Araçlar için Şarj Kabloları, Ankara, 2019.

2.14. Appendices

Explanations, tables, and figures that would disrupt the integrity and continuity of the study should be given in this section if they are included in the report text. The "APPENDICES" main section starts from the beginning of a new page and the current page numbering continues. Each appendix finds a place on a separate page and is indicated by expressions and explanatory texts such as APPENDIX 1, APPENDIX 2, APPENDIX 3, etc. in the upper left corner of the page.

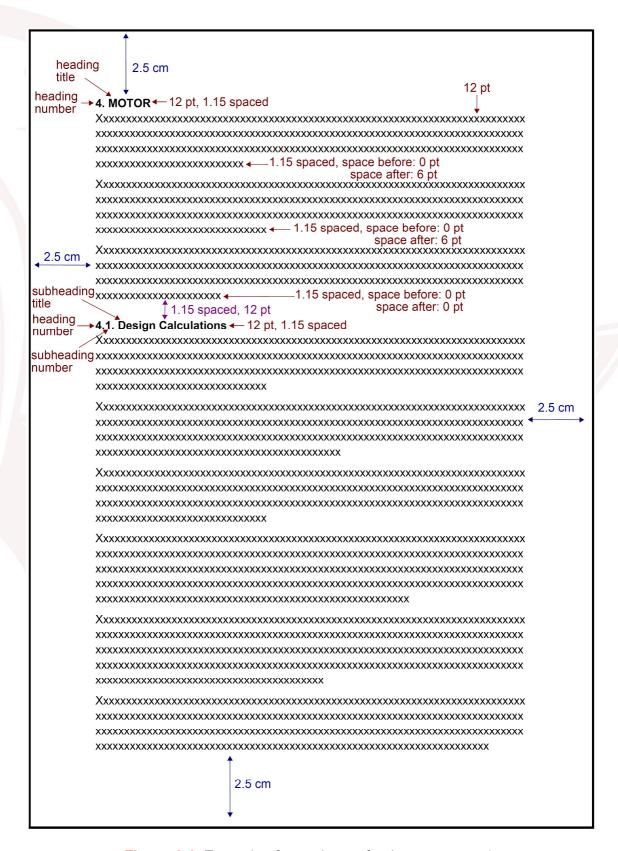


Figure 2.1. Example of page layout for the report text-1.

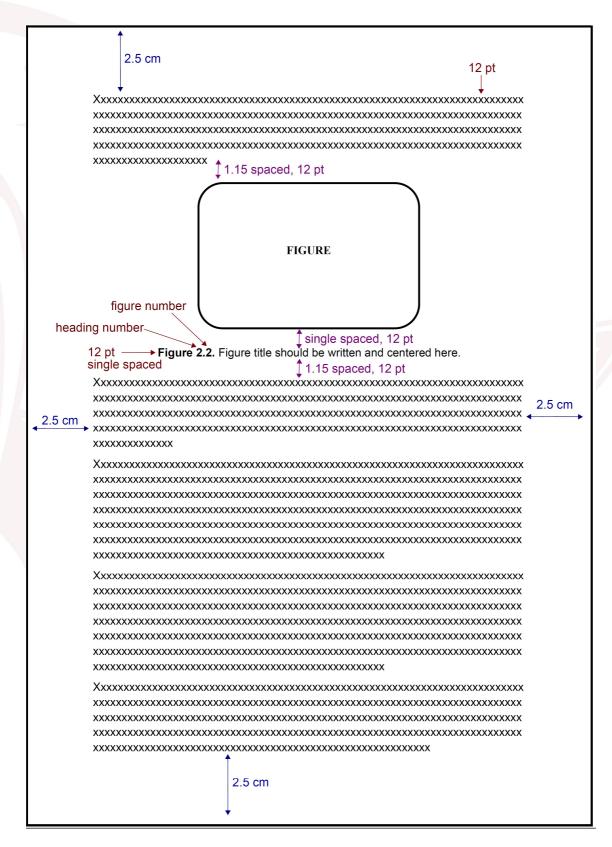


Figure 2.2. Example of page layout for the report text-2.

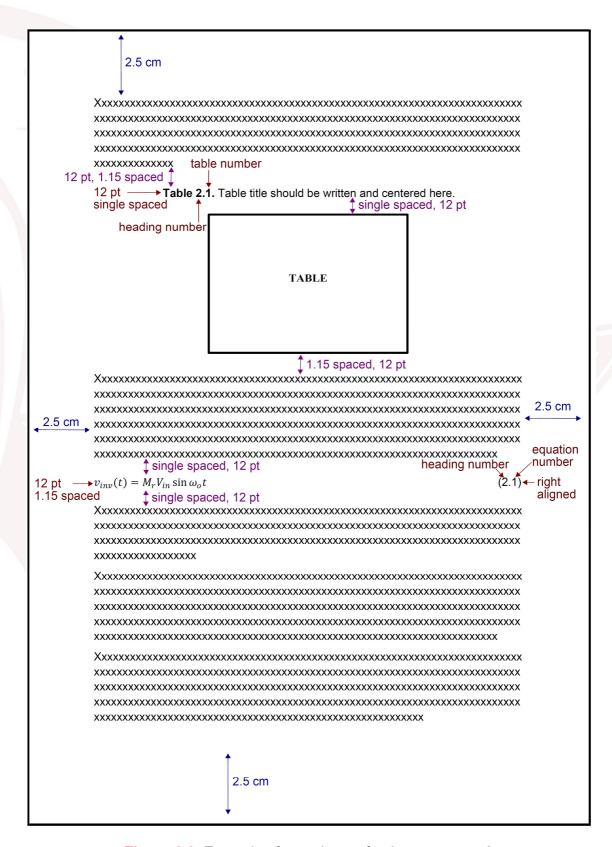


Figure 2.3. Example of page layout for the report text-3.

3. PARTS OF THE REPORT

COVER

CONTENTS

- 1. UP-TO-DATE LIST WITH APPLICATION NUMBER, TEAM NAME, TEAM MEMBERS, AND ADVISOR'S INFORMATION
- 2. CAPSULE DESIGN, ANALYSIS AND MANUFACTURING
 - 2.1. Detailed Design Summary of the Capsule
 - 2.2. Capsule Dimensions
 - 2.3. Other Limitations of the Capsule
 - 2.4. Capsule Weight
 - 2.5. Capsule Materials
 - 2.6. Structural Analysis
 - 2.7. Manufacturing
- 3. CAPSULE POWER CONSUMPTION AND ENERGY SOURCES
 - 3.1. Physical Characteristics of the Battery Pack
 - 3.2. Electrical Characteristics of the Battery Pack
 - 3.3. Safety
- 4. CAPSULE NAVIGATION SYSTEM AND SENSOR INFORMATION
- 5. CAPSULE LEVITATION SYSTEM
 - 5.1. Aluminum Levitation System
 - 5.2. Steel Levitation System
- 6. CAPSULE PROPULSION AND STABILITY SYSTEM
- 7. CAPSULE BRAKE SYSTEM AND PROJECTED CAPSULE SPEED PROFILE
- 8. THERMAL, AERODYNAMIC AND VACUUM ANALYSIS OF THE CAPSULE
 - 8.1. Thermal Analysis
 - 8.2. Vacuum Acceleration and Strength Analysis
- 9. CAPSULE SAFETY EQUIPMENT AND DEPLOYMENT PROCEDURES
- 10. COMMUNICATION AND IMAGE TRANSMISSION
- 11. DYNAMIC MODELING FOR ELECTROMAGNETIC LEVITATION
- 12. BUDGET TABLE
- 13. SCORING TABLE

REFERENCES

APPENDICES

Figure 3.1. Report plan example (Technical Design Report).





