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HCM UNIVERSITY OF TECHNOLOGY
FACULTY OF MECHANICAL ENGINEERING - MECHATRONICS DEPARTMENT



ENGINEERING INTERNSHIP REPORT

Air Compressor Modeling using MATLAB

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Abstract

Describe relevancy of the project and its task/ target. A short description of the technical prerequisites for executing the project. The chapter is required by the company. In any case, it should not be longer than 1 page, ideally 1/2 page.

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Chapter 1

Several Key points

1.1 Morphological Box

Create a morphological box, which is a way of creative thinking in functions and sequence of work steps.

Sub functions		Solutions of the sub functions				
		1	2	3	4	5
A	Sub function 1	solution A1 (1) (3)	solution A2	solution A3		
B	Sub function 2	solution B1 (1) (2) (3)	solution B2 (2)	solution B3 (2)	solution B4	5
C	Sub function 2		solution C2 (2)	solution C3 (1)		solution C5

Table 1.1: A morphological box with 3 concept variants

Legend

(1) = thermal solution

(2) = mechanical solution

(3) = MEM solution

For each bold option, if there are many concept variants, see Table 1.3. In this example, we choose sub function B1 as the optimal solution with 3 variants. If the table does not describe fully or the sub function needs dividing into subgroups, see Table 1.2.

When calling a solution in Table 1.2, we call it position + name of the sub solution (e.g. A2 MEM 1)

Sub functions	Solutions of the sub functions		
	1	2	3
A Sub function 1	Thermal treatment	MEM treatment	
B ...		MEM 1	MEM 2

Table 1.2: A morphological box with 3 concept variants

Sub functions	Solutions of the sub functions		
	1	2	3
B Sub function 2			
Ba Type	Simple	Complex	Mixed
Bb Shape	Round	Square	Triangle
Bc Size (m)	7x2	2x2	3x5

Table 1.3: A morphological box with 3 concept variants

1.2 Evaluation Table

Many evaluation tables are developed in the industry (e.g VDI 2222, VDI 2225). Search for the sheet form on the internet, consult with your supervisor/customer for further information before using it.

General points to remember to make better decisions:

- Use consecutively (following one another).
- Every table should have its own acronym since turning pages is avoided.
- Simple points are related to almost other categories. Examples:
Parallel point values: load carrying $\uparrow \Rightarrow$ beneficial $\uparrow \Rightarrow$ simple point \uparrow
Opposite point values: self-weight $\uparrow \Rightarrow$ bad $\downarrow \Rightarrow$ simple point \downarrow
- Think as a user/customer, not a manufacturer.

1.3 Tabular Re-arrangement

Example:

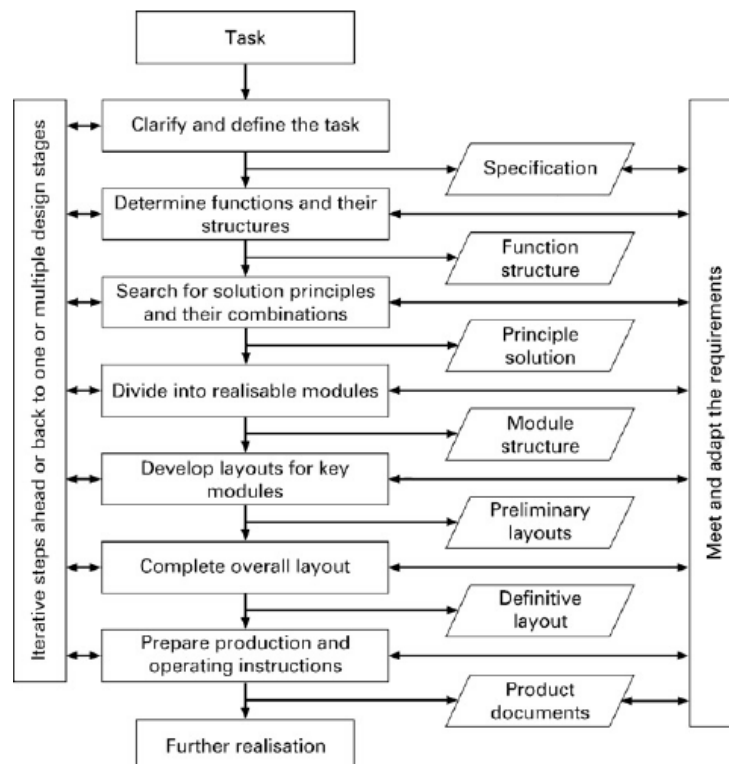


Figure 1.1: A figurative example of VDI 2222

The sterilization temperature for sterilizing the tank should be at least 135°C for 30 min. The sterilizing temperature at the condensomat should not fall below 125°C .

You can "tabularize" the body of paragraph into a table, which is more concise and readable.

Minimum temperatures for sterilizing

location

at the tank

at the condensomat

temperature

temp. = 135°C , 30 min

temp. = 125°C

1.4 Choosing between diagram, table and text descriptions

In general:

- Text description is exact but hard to read.
- Table is exact but still not easy to read.

- Diagram is not exact but easy to visualize and memorable.
- Placing the right thing on a page is essential for a great report.

The next important key point to remember is called text-figure-relationship, which is how and where you place texts and figures in a page:

- Placing figures (diagrams and tables) in an appendix is good for positioning but leads to turning pages multiple times (bad text-figure-relationship).
- Placing figures near/on the same page as the explaining text is a good text-figure-relationship. If the report is double-sided, the figure should be on the same double-page as the text (the diagram and explaining text should either be on odd or even pages).
- Cross referencing to a figure with a statement and add the phrase "Figure xx." at the end after a comma.
- Drawing/scanning the figures as early as possible while writing the explaining text.

Graphics simplify reality (e.g. principle drawing, map), explain abstract ideas by means of spatial arrangement (e.g. bar chart, pie chart, tree chart), create associations (e.g. logo and pictogram).

There are 13 basic rules for information-effective design of figures:

1. Accentuate important items.
2. Delete/leave out unimportant items (use max. 4-7 graphic elements in 1 picture or it is overloaded).
3. Line thickness and font size must be sufficient. Figures should be readable at a distance of 30-40 cm.
4. Relationship of graphic elements should be emphasized (lines, arrows, columns, rows, common color). These should be specified in detail (character of the relationship, meaning behind it) using labels and explanations in the legend.
5. Objects near each other belong together.
6. An element placed above or below other elements is regarded as hierarchically super-ordinate or sub-ordinate.
7. Logical/chronological sequence has its elements placed beside each other.

8. Circular arrangement is thought as a cycle or repeated sequence.
9. An element surrounding another element is understood as the outer includes the inner element.
10. Boxes, bars, lines, columns, etc. must be clearly marked (text labels or graphical explanations).
11. 1 type of element may have only 1 function within one/series of figures (e.g. arrows for vector direction).
12. x -axis is horizontal, y -axis is vertical
13. Look up for standardized symbols (e.g. DIN 66001 for flow charts, DIN 32520, DIN 66261).

Chapter 2

Summary and Conclusions

Last chapter. Provide discussions: what should be done/ has been reached; difficulties in the making of this project. Describe logical relation of the previous chapters. (optional) give advice for a reasonable continuation of the project.

During the internship, I had a chance to get acquainted with a new working environment. I have accumulated experience in industry knowledge as well as experience skills above Marghitu, 2009.

I was trained in problem solving skills in many stages, trying to complete the job in the shortest time, boldly exchanging and sharing knowledge. At the same time, it also fosters a lot of knowledge about graphic software as well as programming skills to solve the problems learned in school but professionally and saves more time Khac Liem, 1984.

Shortcomings: the skill is not mature which still takes a long time to execute; the ability to think and propose design plans is limited due to the lack of practical experience and in-depth knowledge Khac Liem, 1984.

Solution: practice more software skills, add additional specialized knowledge that is lacking.

latex

mathematics

Chezy equation

Glossary name Complicated name (thuật ngữ tiếng Việt)

Appendix A

Appendix

A.1 List of Abbreviations

A.2 List of Tables

Should be limited unless the table is out of context at that part of writing How to reference table:

- abc xyz, Table A.1.
- abc xyz, see Table A.1.
- abc xyz shows the following table. (direct referencing)
- abc xyz shows Table A.1

Pr	Parameters				Pr	Parameters				Pr	Parameters			
	P_3	u_1	u_2	u_3		P_3	u_1	u_2	u_3		P_3	u_1	u_2	u_3
1	2.5	2	2	3	31	6.5	4	2	3	61	12	3	2	4
2	2.5	2	2.24	4	32	7	3	2.24	3	62	12	4	2.24	2
3	2.5	4	2.5	4	33	7	4	2.5	4	63	12.5	3	2.5	3
4	3	2	3.15	3	34	7	3	3.15	4	64	12.5	3	3.15	4
5	3	2	3.55	3	35	7	2	3.55	3	65	12.5	4	3.55	2
6	3	4	4	2	36	7	3	4	4	66	12.5	3	4	4
7	3	2	2	3	37	7.5	4	2	2	67	12.5	4	2	3
8	3	4	2.24	3	38	7.5	4	2.24	3	68	12.5	4	2.24	2
9	3.5	3	2.5	2	39	7.5	4	2.5	3	69	13	4	2.5	4
10	3.5	4	3.15	2	40	8	4	3.15	3	70	13	3	3.15	4
11	3.5	3	3.55	2	41	8	4	3.55	2	71	13	2	3.55	2

	P_3	u_1	u_2	u_3		P_3	u_1	u_2	u_3		P_3	u_1	u_2	u_3
12	3.5	3	4	4	42	8	4	4	3	72	13	3	4	2
13	4	4	2	3	43	8	2	2	3	73	13	4	2	3
14	4	3	2.24	3	44	8.5	2	2.24	2	74	13	3	2.24	3
15	4	3	2.5	4	45	8.5	2	2.5	3	75	13	2	2.5	4
16	4	4	3.15	2	46	8.5	3	3.15	2	76	13	4	3.15	4
17	4	3	3.55	3	47	8.5	2	3.55	2	77	13.5	4	3.55	4
18	4	3	4	2	48	8.5	4	4	3	78	14	3	4	2
19	4	4	2	3	49	9.5	2	2	3	79	14	2	2	4
20	4	4	2.24	3	50	9.5	4	2.24	4	80	14	3	2.24	2
21	4.5	3	2.5	2	51	10	4	2.5	4	81	14	3	2.5	4
22	4.5	3	3.15	3	52	10	4	3.15	3	82	14.5	4	3.15	4
23	5.5	4	3.55	4	53	10.5	4	3.55	4	83	14.5	3	3.55	4
24	5.5	2	4	3	54	10.5	2	4	4	84	15	3	4	2
25	6	3	2	4	55	10.5	2	2	4	85	15	2	2	3
26	6	2	2.24	4	56	10.5	2	2.24	2	86	15	4	2.24	3
27	6	4	2.5	4	57	10.5	2	2.5	2	87	15.5	3	2.5	3
28	6	4	3.15	3	58	11	4	3.15	3	88	15.5	3	3.15	4
29	6	4	3.55	3	59	11	3	3.55	3	89	16	4	3.55	2
30	6.5	2	4	3	60	11.5	2	4	4	90	16	4	4	3

Table A.1: A long table

A.3 List of Figures

Should be limited unless the figure is out of context at that part of writing

A.4 Important Standards

A.5 Bill of Materials

A.6 Drawings (in drawing roll)

Could be included in this appendix section as figures

A.7 Manufacturer Catalogues (in separate folder)

Appendix B

Drawings (if you don't have drawing rolls)

B.1 Bill of Materials

B.2 Assembly drawing

B.3 Component drawings: 1

B.4 Component drawings: 2

B.5 Component drawings: 3

Glossary

Chezy equation Chezy equation,

$$a = b + c$$

which is commonly used. 12

complicated name (thuật ngữ tiếng Việt) glossary description. 12

glossary name glossary description. 12

latex Is a mark up language specially suited for scientific documents. 12

mathematics Mathematics is what mathematicians do. 12

References

- Khac Liem, L. (1984). *Huong dan Thiet ke Mon hoc Nguyen Ly May*. Service Education School HCMC.
- Marghitu, D. B. (2009). *Mechanisms and Robots Analysis with MATLAB*. Dordrecht Springer.

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