

EXTERNAL EXAMINER'S COMMENTS AND CORRECTIONS

Page	Paragraph	Corrections
4		Title should be "Table of Contents" Font matter e.g Abstract should be included in Table of Contents Sections of Chapter 2 should be number as 2.1, 2.3, 2.3, etc.
5		First section of Chapter 3 should be corrected to 3.1
6		Appendices should not be numbered as a continuation of the main body of the report. Change to A.1, B.1, etc
7		Correct consistency of the numbering of Figures
11		Appendix figures should be numbered differently
13		Appendix tables should be should be numbered differently
14		Include list of symbols
15	2	In line 7, Clarify the term "pressure". Not clear what that refers to.
16	1	Change "Figure 1" to "Figure 1-1"
16	2	Change "Figure 1" to "Figure 1-1"
18	2	In 3rd line correct "Laser" to "laser"

19	2	In 6th line change "stress" to "stresses" and "strain" to "strains"
21	1	In line 1 delete "J.D" and change and change "for" to "on"
21	1	In line 6 change "position" to "positions"
21		Revise Table 1-2 caption to have all initial caps e.laser and stainless
22		Change "Figure 1.-1" to "Figure 1.1-3"
23	1	In line 6, change "speed" to "speeds". In line 8 delete "a" and change "angle" to "angles"
24		Change "Figure 1-2" to "Figure 1-4"
24	1	In line 1 change Figure "1-2" to "Figure 1-4"
24	1	In line 3 insert a full stop after P.

25 Change Figure caption from "Figure 1-3"
to "Figure 1-5"

26 1 Consider revising first sentence to
improve clarity.
28 1 In line 10 "bends" to "bend"
28 Change section number "I" to "1.3.1"

29 Change figure caption from "Figure 1.3-
1" to "Figure 1-6". Apply the changes to
all other figures in the report.

29 2 In last line change "Figure 1.3-1" to
"Figure 1-6"
30 Change section number from "II" to
"1.3.2"

30 1 In line 3 delete "a", insert full stop after
"d" and change "refer" to "Refer"

30 2 In line 2 clarify the "0 degree" value

31 Revise last sentence
33 Indicate source of all the equation i.e.
show reference.

34 Change figure caption from "Figure1.3-3"
to "Figure 1-8"

34 Give references for the equations

- 37 1 In line 3, replace "in" with "at"
- 36 Change the numbering of Tables to follow the same style as that for Figures
- 38 1 In line 3 change "than7000rpm" to "than 7000rpm"
- 38 2 In line 3 change "built" to developed".
- 38 3 In line 5 delete "and"
- 38 3 In line 6 change "Figure 1.4-1" to the appropriate figure number
- 39 Change numbering for "Figure 1.4-1"
- 39 1 In line 3 change "directions as" to "directions are as". Figure number.
- 40 1 In line 1 check figure number.
- 40 1 In line 2 remove author initials.

41		Change figure number
41	1	In line 2, change "However, tool" to "However, as too"
42		Change figure number
43	1	In line 1, change "from 100" to "from 100"
43	2	In line 1, delete "research".
43		Change figure numbers
44	1	In line 1, change "High" to "high"
44	1	Change "&" to "and"
45		No need for table with only one parameter. Remove Table 1.5-2
45		Change Table numbering
46		Change figure numbering
47		Change figure numbering

49 2 In line 3, change "be resulted due to" to "resulted from"

50 Change figure numbering

51 1 In line 2, change "which is resulted by failure" to "which resulted from failure"

52 2 In line2, change "Furthermore" to "Furthermore,"and "through" to

52 2 In line 7, replace "covered" with "presented".

- 53 1 In line 2, replace "in" with "in the".
- 53 2 In line 2, replace "finishing" with "finish".
- 54 Change section number from "1.1" to
"2.1"
- 54 1 Last line, Table 2.3-1 has not been given
- 55 Caption for Figure "1.1-1" should be
changed to "Figure 2.1"

55 1 In line 2, change "spacing" to "spacings"
In line3, change "spacing" to "spacings"
In line 6, delete "below".

56 Change caption for "Figure1.1-2" to
"Figure2..."

57 Correction figure number to "Figure 2..".
Figures included in this section must be
for actual equipment used and not from
reference sources.

58 1 In line 1, delete "A" and change
"microanalysis" to "Microanalysis"

58 Correct figure caption number.

58 2 Change "school of mechanical engineering" to "School of Mechanical Engineering"

59 Correct figures caption

60 Correct figure caption number.

60 2 In line 4, delete "is" and replace "representing" with "represents"

60 2 In line 5, replace "representing the" to "presentng".

61 Correct figure caption number.

61 1 In line 1, delete "Test"
In line 5, change "representing the" to
"presents the".

62 Correction figure caption number

63 1 In line1, give reference.

64 Correct table caption number

64 3 In line 2, delete "to establish".

65		Correction table caption number
66	1	In 3rd from last line, revise sentence not clear
67	1	In line 2, remove power 3.
68	2	In line 2, remove power 3.
73	1	In line 2, correction the figure citations, especially 3.42
74		In Figure 3.4-1, correct repeated L1F2 in key
82	2	Last line, revise sentence not logical
88	1	In line3, correct the figure citation. There is no Figure 25
95	2	In last line, delete first "the". Mean values of roughness too high.
104		Correct.
124	2	Correct bullet number, should not start at 3.

126

Correct figure caption numbering. There are two different numbers

141

Clean up references list. Do not use first name is done in reference 1 and 3

EXAMINER 2

Comments

1. Title is changed to "Table of Contents"
2. Abstract is included in the Table of Contents
3. Chapter 2 numbering is corrected to be 2.1, 2.2, 2.3, etc.

First section of Chapter 3 is now corrected to 3.1 "3.1 Laser Beam Forming" to "3.1 Laser Beam Forming"

Appendices numbering is now changed to A.1, B.1, C.1, and D.1 "B.1 Experimental Procedure Data"

The numbering of figures is now consistent, to reflect the chapter and section.

The numbering of figures has now been changed to follow this sequence "Figure B.1 Line Chart of Sample Displacement as a Function of Position, on Low/Level 1 LBF Parameters"

This is the new appendix numbering "Table A.1 Experimental Equipment Data"

List of symbols is included refer to page 13

This was meant to be laser light. The sentence is now corrected as follows "

Consequently, the laser induces plastic strains, bending the material with a heat source which is mainly used for straightening and curving steel components"

Figure 1 in paragraph 1 has been changed to "Figure 1.1 Schematic of the Laser Beam Forming process [1]"

"Figure 1" in paragraph 2 has been changed to "Figure 1-1"

3rd line in paragraph 2 has been changed from "Laser" to "The laser power P, beam diameter B, scan velocity V, number of scans N, and the cooling flow C are very important process parameters in LBF process."

In 6th line changes were made from "stress" to "stresses" and "strain" to "strains" see " The area on the material where the laser beam is starting to be introduced, the stresses and strains are tensile"

In line 1 "J.D" has been deleted and "for" has been changed to "on" "A study on laser bending of AISI 304 stainless steel sheet using a high power (2 kW) continuous wave CO2 laser with a 3mm beam diameter was looked at [7]."

In line 6 "position" was changed to "The micro-hardness of the bent sheet at different positions was carefully measured using a Vickers micro-hardness tester. "

The caption for Table 1-1 has been revised to have all initial caps "Summary of Process Parameters (Sheet thickness, Power density, Scan speed, Number of passes) Employed in laser Bending of AISI 304 stainless Steel [7]"

"Figure 1-1" is changed to "Figure 1.1 1 Variation of angle of bending with scan speed in laser bent AIS 304 stainless steel sheet with a thickness of (a) 1.6mm and (b) 0.9 mm, respectively [7]" to suit the numbering sequence because the figure was numbered incorrectly.

In line 6, change "speed" to "Also, the range of scan speeds used for bending the 1.6mm thick sheet without the adverse effect of surface evaporation is between 500 mm/min–3000 mm/min". In line 8 delete "a" and change "angle" to "These results are significantly lower when compared to those achieved for bending angles of a 0.9mm thick which are between (3500 mm/min–7500 mm/min)."

"Figure 1-2" has been changed to "Figure 1.1-2" to follow the same numbering sequence

In line 1 Figure "1-2" is changed to "Figure 1.1-2" to follow the same numbering sequence

A full stop after P In line 3 is inserted .

Caption on "Figure 1-3" has been changed to "Figure 1.1-3" to follow the same numbering sequence

The sentence is revised from "Literature reveals that one of the most important factors concerning the workpiece in LBF process is the sheet thickness." to "The literature indicates that one of the most important factors concerning the in LBF process is the sheet/material thickness." In line 10 "bends" is changed to "bend" Section number "1" is changed to "1.3.1"

Figure numbering sequence is the chapter followed by the subsection "Figure 1.3-1" in this instance, the figure is corresponding

Figure numbering sequence is the chapter followed by the subsection "Figure 1.3-1" in this instance, the figure is corresponding

Section number "II" is changed to "1.3.2" In line 3 "a" was deleted, a full stop after "d" was inserted and "refer" was changed to "Refer"

It is assumed that the initial temperatures of zone 1, 2 and 3 is 0 , meaning before the introduction of the heat source The initial sentence is changed from "The ~~final~~ expansion value of zone 1, "The equation for the final expansion ~~value of zone 1,~~ shortening value"

The equations are referenced [22, 23]

Figure numbering sequence is the chapter followed by the subsection "Figure 1.3-3" in this instance, the figure is corresponding Equations are referenced "NB: The temperatures of the top and bottom surfaces of the LBFormed plates is given by [22, 23]:

$$T(t, y) = T_0 + \frac{q_0}{k} \left(\frac{y^2}{2} - \frac{y^2}{2} \right)$$

"

In line 3, "in" is replaced with "at" see "Similarly, a significant formability enhancement at forming AZ31, AZ61 and AZ80 magnesium alloy sheets was achieved at a tool rotation speed of 8000rpm [40]."

Table numbering is changed to follow the same style as that of Figures "Table 1.4 1 Heat-assisted SPIF methods [38]."

In line 3 change "than7000rpm" is changed to "than 7000rpm" see "The findings showed that the material formability was dramatically improved due to temperature rising and dynamic recrystallization when tool rotation speed was greater than 7000rpm."

In line 3 change "built" was changed to developed" see "With this approach an increase of material formability was observed and formability limit curves were developed at the varying utilized rotational speeds". This is actually in page 37

"and" n line 5 is deleted. This is actually in page 37

The numbering of "Figure 1.4-1" is in line with the numbering system used. This is actually in page 37

The numbering of "Figure 1.4-1" is in line with the numbering system used. This is actually in page 38

In line 3 "directions as" are changed to "directions are as". Figure 1-10 is corrected to Figure 1.4-2. This is actually in page 38

In line 1 figure number is corrected to "Figure 1.4-2". This is actually in page 39

In line 2 author initials are removed.

Previously "In a study done by D. Xu and W. Wu [48], the forming tool is indented into the blank sheet, Fz force is instantaneously introduced and then gradually increased until the force peak is reached".now "According to a study done in the literature [48], the forming tool is indented into the blank sheet, Fz force is instantaneously introduced and then gradually increased until the force peak is reached."

The numbering of "Figure 1.4-5" is in line with the numbering system used.

In line 2, "However, tool" is changed to "However, as too". This is actually in page 40.

figure number is corrected to "Figure 1.4-5".

In line 1, "from 100" is changed to "from 100". This is actually in page 41

"Mild Steel was preferred for this research investigation because it is one of the most common steels and one of the least expensive steels available" now "Mild Steel was preferred for this investigation because it is one of the most common steels and one of the least expensive steels available"

The numbering system is in line with the chapter number, and sub-section. Also, the numbering sequence is correct.

"i. Reasonable strength-to-weight ratio & High stiffness-to-weight ratio" is now changed to "i. Reasonable strength-to-weight ratio & high stiffness-to-weight ratio" This is actually in page 42.

"iii. Very cheap, easy to shape, & easy to weld" is now changed to "iii. Very cheap, easy to shape, and easy to weld". This is actually in page 42

"Table 1.5 2 Physical properties of AISI 1008 Carbon Steel [50]" is removed and replaced with " The physical properties of AISI 1008 carbo steel are; density at (composition 0.06%C, 038% Mn, 0.01% Si, annealed at 925oC is 7.872 g/cm3 (Metric) or 0.2844 lb/in3."

Table numbers are changed to follow the correct sequence after Table 1.5-2 is removed.

Figure numbering are following the same sequence, chapter and sub-section.

Figure numbering are following the same sequence, chapter and sub-section.

"In physical experiments, inaccuracy can be resulted due to measurement errors, while in computer experiments, numerical noise is a result of the incomplete convergence of iterative processes, round-off errors, or the discrete representation of continuous physical phenomena [54]" is now changed to "In physical experiments, inaccuracy can result from to measurement errors, while in computer experiments, numerical noise is a result of the incomplete convergence of iterative processes, round-off errors, or the discrete representation of continuous physical phenomena [54]" This is actually in page 48.

figure number is corrected to "Figure 1.7-1" and it is in line with the numbering equence.

"LBF is a fast forming process which requires no tooling, but poor material surface quality which is resulted by failure in obtaining optimum bending is what motivated this research. "is canged to "LBF is a fast forming process which requires no tooling, but poor material surface quality which resulted from failure in obtaining optimum bending is what motivated this research. " This is actually in page 50
"Furthermore the hardness testing is also carried through to determine if LBF process parameters have any effects on material hardness." is changed to "Furthermore, the hardness testing is also carried through to determine if LBF process parameters have any effects on material hardness. " This is actually in page 50

"The RSM is covered in Chapter 5, while chapter 6 is the concluding chapter." is now changed to "The RSM is presented in Chapter 5, while chapter 6 is the concluding chapter." This is actually in page 51

"This chapter gives a general overview of this research together with the experimental optimisation and experimental procedures used in investigation. " is now changed to "This chapter gives a general overview of this research together with the experimental optimisation and experimental procedures used in the investigation. "

"The samples are AISI 1008 mild steel and this research is focused on optimising LBF process parameters to achieve maximum bending with excellent surface finishing" is now changed to "The samples are AISI 1008 mild steel and this research is focused on optimising LBF process parameters to achieve maximum bending with excellent surface finish".

Section number has been changed from "1.1 Introduction to "2.1 Introduction".

This is actually in page 52.

"The quantities that are associated with each level for a specific parameter in the LBF process are also presented in Table 2.3-1 of section 2.3-1 of this report." The table is presented in page 63.

"Figure 1.1 1 Figure 4 1 A 4.4 kW Nd: YAG laser system – Rofin DY 044" is now changed to "Figure 2.2 1 Figure 4 1 A 4.4 kW Nd: YAG laser system – Rofin DY 044 ".

This is actually in page 54

In line 2, " Each sample is identically machined by passing a laser light at equal parallel spacing, set at 10 mm apart along the width of the surface area of each sample" has been changed to "Each sample is identically machined by passing a laser light at equal parallel spacings, set at 10 mm apart along the width of the surface area of each sample."

In line 3, "The distance between these spacing (laser scan track) are set such that, the laser heated zone does not overlap with the next laser scan track. " has been changed to "The distance between these spacings (laser scan track) are set such that, the laser heated zone does not overlap with the next laser scan track."

In line 6, "Figure 2.2-2 below is a presentation of LBFormed experimental samples that are machined using levels 1, 2 and 3 quantities for the five mentioned LBF process parameters. " has been deleted "Figure 2.2-2 is a presentation of LBFormed experimental samples that are machined using levels 1, 2 and 3 quantities for the five mentioned LBF process parameters."

"Figure 2.2 2 A 200 x 50 x 3 mm³ mild steel -AISI 1008 LBF Samples." is now changed to "Figure 2.2 2 A 200 x 50 x 3 mm³ mild steel -AISI 1008 LBF Samples".

This is actually in page 55

Figure number is corrected to "Figure 2.2 3 Mahr Dial Indicator, 30 Centimetre (cm) Steel Ruler, Square Steel Bar, and G-Clamp" and these are actual equipment used. This is actually in page 56

"A microanalysis was done on LBFormed samples for further investigation and verification of the results generated from the LBF process parameters. "is now changed to "Microanalysis was done on LBFormed samples for further investigation and verification of the results generated from the LBF process parameters." and the "A" is deleted. This is actually in pge 57

Figure caption number has been changed to "Figure 2.2 4 A 200 x 50 x 3 mm³ mild steel -AISI 1008 LBF Samples Schematic Sectioned ". This is actually in page 57.

"The NSM V horizontal milling machine from the "school of mechanical engineering" was used to cut the 200 x 50 x 3 mm³ AISI 1008 mild steel laser formed samples to 65 x 20 x 3 mm³ that are able to fit on the stage of the microscope." is now chaged to "The NSM V horizontal milling machine from the "School of Mechanical Engineering" was used to cut the 200 x 50 x 3 mm³ AISI 1008 mild steel laser formed samples to 65 x 20 x 3 mm³ that are able to fit on the stage of the microscope. " This is actully in page 57

Figure caption has been corrected to "Figure 2.2 5 The NSM-V horizontal milling machine" This is actully in page 57

Figure caption number has been changed to "Figure 2.2 7 Leica TCP SP2 SE Confocal microscope."

"Figure 2.2-9 is representing the Future Tech FM-700 micro-hardness tester. " is now changed to " Figure 2.2-9 presents the Future Tech FM-700 micro-hardness tester. "

"Figure 2.2-9 is representing the Future Tech FM-700 micro-hardness tester. " is now changed to " Figure 2.2-9 presents the Future Tech FM-700 micro-hardness tester. "

Figure caption number is now changed to "Figure 2.2 9 Future Tech FM-700 micro-hardness tester"

"The following discussions are around the equipment and tools that were used during the MMU, HV Test, the Taguchi DOE, and the RSM modeFRONTIER for the analysis of LBFormed samples." is deleted
"The following discussions are around the equipment and tools that were used during the MMU, HV, the Taguchi DOE, and the RSM modeFRONTIER for the analysis of LBFormed samples."

In line 5, representing is now changed to
"Figure 2.2-7 presents the Leica TCP SP2 SE Confocal microscope, whilst Figure 2.2-8 presents the FEI Quanta FEG-SEM microscope. The details of the MMU are in Chapter 4 of this report."

*Figure caption number is changed to follow the correct numbering sequence
"Figure 2.2 9 Future Tech FM-700 micro-hardness tester"*

Line 1, has been reference "This is a robust design philosophy, developed by Genichi Taguchi in the late 1940s [55]. "

The table caption number is made to follow the same sequence numbering system as the figures, chapter 1st, then the sub-section. "Table 2.3 1 Taguchi Orthogonal Array Selection Matrix"

"This means by using the Taguchi Method where there are five parameters under these parameters and three levels, to establish to establish the DoE, only 27 (5x3!)-3 samples will be assessed, rather than the 729 samples that would have had to be assessed for a full factorial DoE see Table 2.3-2" the repeat words are now deleted "This means by using the Taguchi Method where there are five parameters under these parameters and three levels, to establish the DoE, only 27 (5x3!)-3 samples will be assessed, rather than the 729 samples that would have had to be assessed for a full factorial DoE see Table 2.3-2"

Table caption number has been corrected to follow the numbering sequence "Table 2.3 2 Taguchi L27 orthogonal array DOE used experimental parameter optimisation"

"The ability of this tool assist in deriving the selection of the best population." is now changed to "modeFRONTIER assist in deriving the selection of the best sample population from those which are derived from the DOE."

power 3, in line 2 is removed

power 3, in line 6 is removed

The figures citations are now changed to follow the numbering sequence, "refer to Figure 3.4-1, 3.4-2, and 3.4-3. "

Repetition is has been corrected in

"Figure 3.4 1 Graph of Sample Displacement as a Function of Position on Low/Level 1 LBF Parameters"

"Consistency in sample bending results is also observed by non-overlapping of sample bending results between LBF level parameters i.e. level 1 LBFormed samples have the least bending with no samples that are found to be in the same region as the level 2 sample bending results for an increment reading." is now changed to "Non-overlapping of sample bending results i.e. the results derived from low LBF parameters do no coincides with those derived from samples LBF using medium LBF parameters. "

Figure 25 has been correced to "The fast focus knob shown in Figure 4.2-4 was used to focus the sample."

"Then the continuous button as in Figure 4.3-5 was clicked for the microscope to capture the all images in the above selected series range as in 4.6-2." the is now

Mean amplitute verified and is correct.

Bullet numbers are now corrected and it is starting at 1 "1. Create a spreadsheet using Microsoft Excel that has the Taguchi OA and the response values (such as Table 2.3-2)."

"Figure 5.1 1 Figure 4 1 Screenshots to show the modeFRONTIER response surface creation tool; the definition of the inputs, outputs, algorithm and the response surface that is generated in the Design Space" is now changed to "Figure 5.1 1 Screenshots to show the modeFRONTIER response surface creation tool; the definition of the inputs, outputs, algorithm and the response surface that is generated in the Design Space" and Figure 4 1 has been deleted

First names are now removed in reference 1 and 3.