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TO REDUCE THE REJECTION AT PHOSPHATING MACHINE IN REFLECTOR MAKING PROCESS

[1]Piyush Jain,
M.TEch, Production Engg. RIET, Jaipur, Rajasthan (India)
piyushjain1802@gmail.com

[2]Prateek Verma
Assistant Professor, Mechanical department, RIET, Jaipur, Rajasthan (India)
me.prateek@rietjaipur.ac.in

[3]Sharad Shrivastav
Assistant Professor, Mechanical department, RIET, Jaipur, Rajasthan (India)
sharad_bhs@rediffmail.com

***Abstract*— This Report gives the quality improvement that are needed to reduce the defectives at the " Phosphating machine in process shop" which also helps in reducing rejections in process shop of manufacturing of reflectors at Autolite (India).ltd.vishwakarma industrial area, Jaipur.**

The "Phosphating machine process" of manufacturing Reflectors of head lights are studied in detail and the problem areas that contribute more significantly to the defectives are identified. We found the major problem in Phosphating machine is due to "improper handling and incorrect cycle time in Phosphating machine shop"

After the detailed study and observation some of the in consistencies in above process and machine maintenance were removed that resulted in quality improvements and defects at the process stage were reduced PHOSPHATING MACHINE from 2.09% to 1.95 %

Keywords*— *Reflector, Cycle Time

I. INTRODUCTION

Autolite Group is a focused, dynamic and progressive group providing customers with Innovative Products at economic Prices. The Group has core competencies in manufacturing of Automotive Head Lamps, Work Lamps, LED Lamps, Fog Lamps, Turn Signal Lamps, Halogen Bulbs, and Incandescent Bulbs & Miniature Bulbs. These competencies are supported by specialization in Engineering Design, Information Technology, and Tool Manufacturing & Machine Building.
The company was formed with the objective to design, manufacture and market automotive lighting products globally

II. SCOPE AND OBJECTIVE OF RESEARCH

Basically Autolite (India) ltd. is the manufacturing company in which various manufacturing process has been performed such as sheet metal operations, process operations, injection moulding and assembly operations. hence as many as manufacturing operations the problems also been generated regularly and hence there is a lot of scope for research in the solutions of these problems.
The main objective of research is two understand how the problems can be identified, and observations can be taken and how to find out the solutions of problem in order to improve the quality of the product in order to improve the customer satisfaction and also how improve the productivity in the organization to increase the profit
Objectives:

1. To reduce the rejection in phosphating shop

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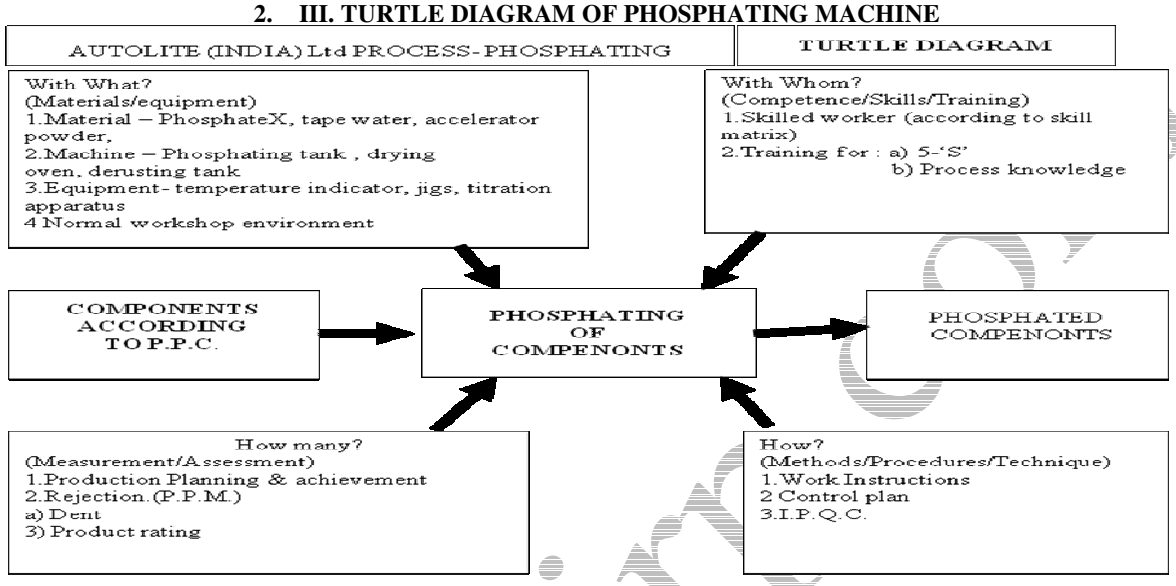
2. III. TURTLE DIAGRAM OF PHOSPHATING MACHINE



IV.OPERATIONS PERFORMED ON AUTOMATIC PHOSPHATING MACHINE IN AUTOLITE (INDIA) LTD

Table 1 Operation Performed on Automatic Phosphating Machine:-

Step	**Operation to be perform**
No. 1.	Properly check the location of working before starting the machine
No. 2	Fill the tank with water and Mix the chemical in the tank 1
No. 3	check the pH value of zinc Phosphating tank by Ph paper it must be between(2+1)
No. 4	Titration of zinc phosphate solution by sodium hydroxide solution 100ml and a reagent is used called phenolphthalein solution (2 drops)
No. 5	Fill fresh water in tank 2
No. 6	check the ph value of water risened tank by ph paper it must be between (6 to 7)
No. 7	Fill the tank with water and Mix the passivate in tank3
No.8	check the ph value of passivation tank by ph paper it must be between (5+1)
No.9	After maintaining the required solution. the first bin is filled with 25 pieces and move the bin by automatic chain gear arrangement to transfer it into first tank
No.10	Bin(jail) takes 84 sec from inlet to tank 1 and similarly next 84sec to another position of tank 1 and again this procedure is repeated until the first bin is came at the outlet of machine

No.11	During working 5 bins(jalis)treated at a time at each bin change its position after 84 sec hence total time consumption of a single bin from inlet to outlet is 420 sec

V.PARAMETERS WHICH INFLUENCE THE PROCESS OF AUTOMATIC PHOSPHATINGMACHINE

1. *Cycle Time*: - For this process control of cycle time is very important. Proper cycle time is necessary because the cycle time tells the amount of time in which the reflector is placed in Zinc phosphate solution in order to make a coating of zinc phosphate In order to prevent from rust .cycle time considered is 7 minutes or 420 sec.
2. *Circulatory water*:-After zinc coating reflector is dipped into water due to this water must be freshed which is maintained by the help of circulatory pump

VI. DEFECTS CAUSE AFTER PHOSPHATING IN REFLECTORS AS SHOWN BELOW

1 Very light yellow marks (due to Phosphating)

2 Marks of rust(due to Phosphating)

Figure 1 represents defects such as Very light yellow marks, Marks of rust.

VII. PAST REJECTION DATA

Table 2 Total April month production in 26 working days 365925 of sheet metal

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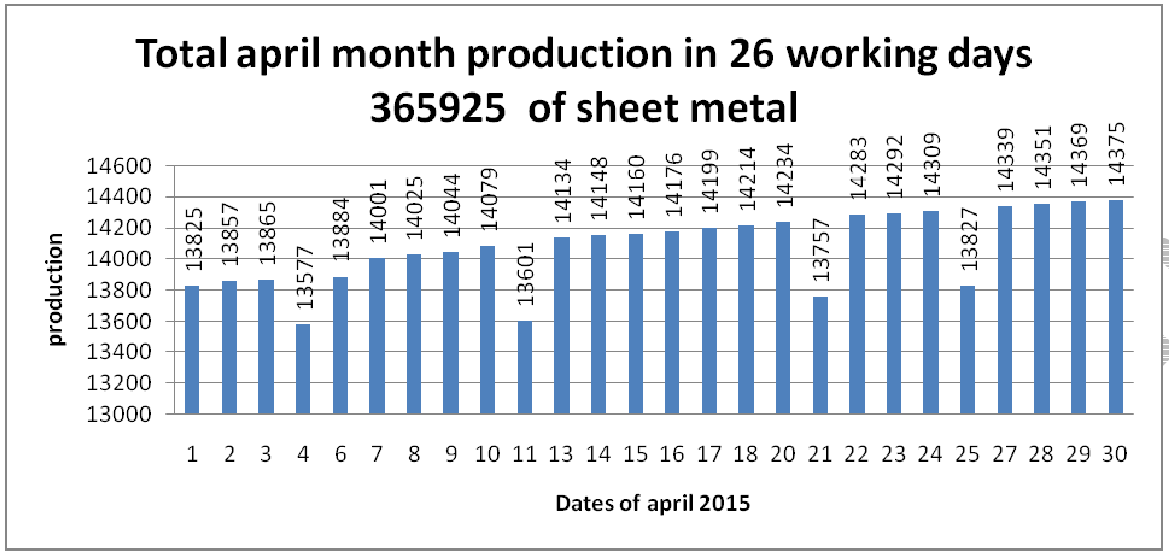
no. of days	dates of April	I shift production	II shift production	daily production
1	1	7465	6360	13825
2	2	7480	6377	13857
3	3	7487	6378	13865
4	4	7330	6247	13577
5	6	7495	6389	13884

6	7	7560	6441	14001
7	8	7573	6452	14025
8	9	7583	6461	14044
9	10	7602	6477	14079
10	11	7344	6257	13601
11	13	7632	6502	14134
12	14	7639	6509	14148
13	15	7646	6514	14160
14	16	7655	6521	14176
15	17	7667	6532	14199
16	18	7675	6539	14214
17	20	7686	6548	14234
18	21	7428	6329	13757
19	22	7712	6571	14283
20	23	7717	6575	14292
21	24	7726	6583	14309
22	25	7466	6361	13827
23	27	7743	6596	14339
24	28	7749	6602	14351
25	29	7759	6610	14369
26	30	7762	6613	14375
Total		197581	168344	365925

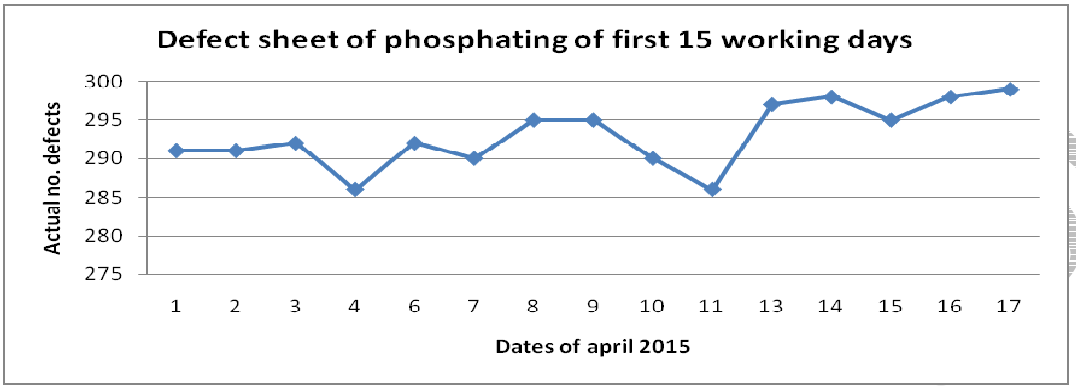


Graph 1 Total April month production date wise PPM

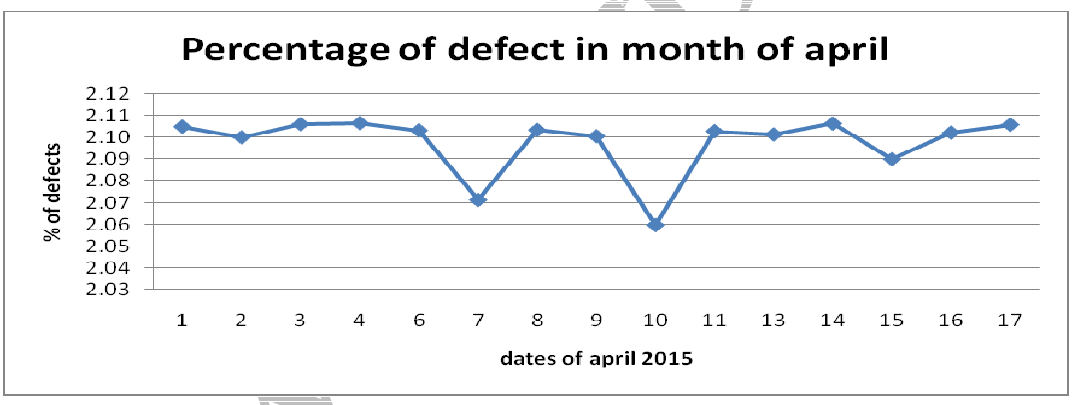
Table 3 Defect sheet of phosphating of first 15 working days

No. of days	dates of April	I shift production	II shift production	daily production	total defects per day	% age of defects
1	1	7465	6360	13825	291	2.10
2	2	7480	6377	13857	291	2.10
3	3	7487	6378	13865	292	2.11
4	4	7330	6247	13577	286	2.11
5	6	7495	6389	13884	292	2.10
6	7	7560	6441	14001	290	2.07
7	8	7573	6452	14025	295	2.10
8	9	7583	6461	14044	295	2.10
9	10	7602	6477	14079	290	2.06
10	11	7344	6257	13601	286	2.10
11	13	7632	6502	14134	297	2.10
12	14	7639	6509	14148	298	2.11
13	15	7646	6514	14160	295	2.09
14	16	7655	6521	14176	298	2.10
15	17	7667	6532	14199	299	2.11

Total		113158	96417	209575	Average=2.09



Graph 2 Actual number of in defects PPM date wise in April month



Graph 3 Percentage of defect in April month date wise

VIII. FINDING SUGGESTION AND IMPLEMENTATION

Table 4 Root causes and the actions to be taken In Automatic Phosphating machine:-

Root causes and action to be taken for yellow or rust marks by increasing cycle time from 5 minutes (300sec)to 7 minutes(420sec)		
S.no.	*Cause*	*Action*
1	Lack of Zinc phosphate solution filled in the tank	Regular checking tank by operator with the help of titration twice in a day
2.	Circulation of water	Water should be circulated by the help of circulatory pump
3	Lack of Ph value	Proper checking of Ph value by operator with the help of Ph paper
4	Cycle Time	Main important parameter is cycle time which is now

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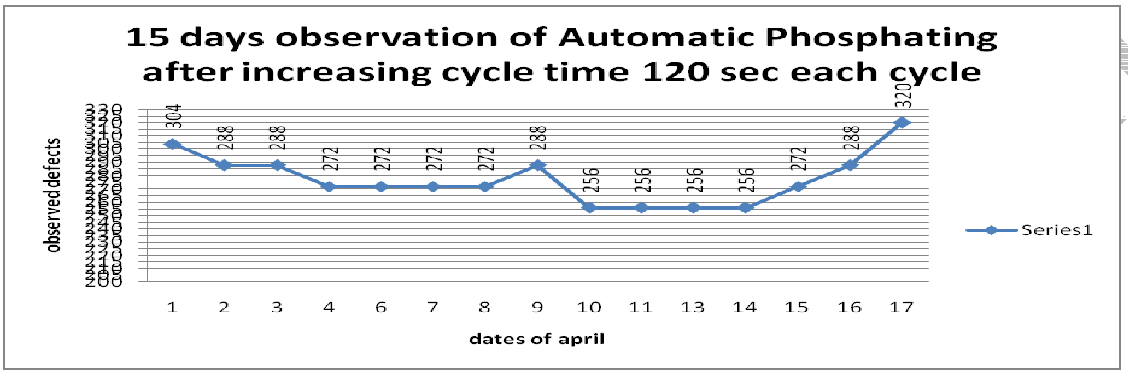
		increased from 5 minutes (300sec) to 7minutes(420)sec
5	New untrained operator	Training to be given to the operator before starting the job

OBSERVATIONS AFTER IMPLEMENTATION OF SUGGESTIONS

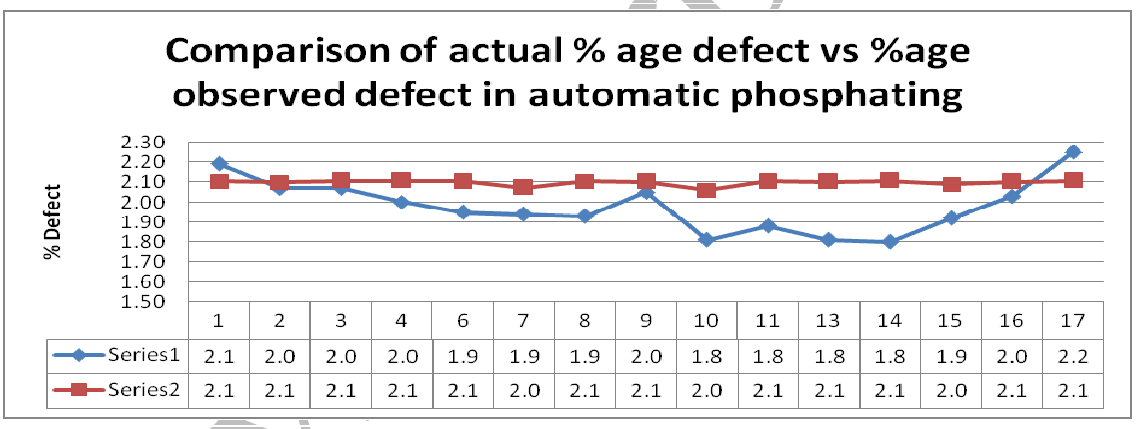
Table 5 Observatory analysis for Optimization of process parameters in Automatic Phosphating machine

15 days Observation of automatic phosphating after increasing cycle time 120 sec each cycle								
no. of days	dates of April	daily production	actual % age of defects	cycle time of phosphating 60*5=300 sec (5 min)	1 hr observation of defects from 1hr production	8 hr observation (1 shift) (1 hr observe * 8)	16 hr observation(two shifts) (1 hr observe * 16)	% age defects on the basis of observations
1	1	13825	2.10	300+2*5=310	19	152	304	2.19
2	2	13857	2.10	310+2*5=320	18	144	288	2.07
3	3	13865	2.11	320+2*5=330	18	144	288	2.07
4	4	13577	2.11	330+2*5=340	17	136	272	2.00
5	6	13884	2.10	340+2*5=350	17	136	272	1.95
6	7	14001	2.07	350+2*5=360	17	136	272	1.94
7	8	14025	2.10	360+2*5=370	17	136	272	1.93
8	9	14044	2.10	370+2*5=380	18	144	288	2.05
9	10	14079	2.06	380+2*5=390	16	128	256	1.81
10	11	13601	2.10	390+2*5=400	16	128	256	1.88
11	13	14134	2.10	400+2*5=410	16	128	256	1.81
12	14	14148	2.11	410+2*5=420	16	128	256	1.80
actual average %age defect of 12 days			2.09		Average %age defects(first 12 days of observation)			1.95
observation after increasing of cycle time more than 120 seconds								
13	15	14160	2.09	420+2*5=430	17	136	272	1.92
14	16	14176	2.10	430+2*5=440	18	144	288	2.03

15	17	14199	2.11	440+2*5=450	20	160	320	2.25
actual average %age defect of 3 days			2.1		Average %age defects(last 3 days of observation)			2.06

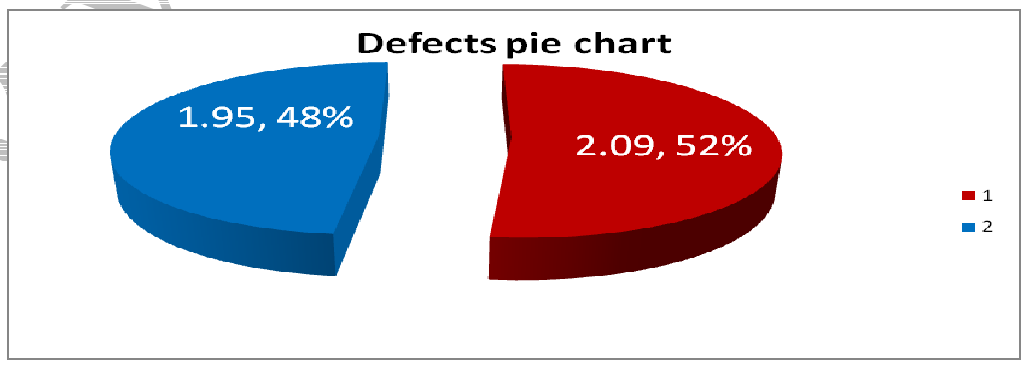


Graph 4 Observed defect of Automatic phosphating machine after increasing cycle time



	1	2	3	4	6	7	8	9	10	11	13	14	15	16	17
Series1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.8	1.8	1.8	1.8	1.9	2.0	2.2
Series2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1

Graph 5 Comparison of actual % defect vs. % observed defect in automatic phosphating



Graph 6 Pie chart shows percentage defect before and after increasing cycle time

IX. DISCUSSION ON RESULTS

Results obtained from above observations:

From the 15 days observations we find the following:

1 As we increase the cycle time after 12 days we find the optimize reduction of rejection of sheet metal form **2.09% to 1.95%** after 12 days or by increasing cycle time 120 sec (i.e. from 5 min to 7 min)

2 After 12 days observations i.e. from day 13 to day 15 we find that the rejection may reduce from 2.1 to 2.06%. But it is very less and may also increase the cycle time to UN feasible state.

Causes of reduction of rejection by reducing cycle time:

1 In actual condition cycle time is 5 min(i.e. 300sec) but when cycle time increases to 7min (420)sec the rejection reduced this may be because the sheet metal is dipped in the Phosphating tank less 120 sec than required for Phosphating

Due to less dipping time there may be a thin layer of coating deposited on the surface of sheet metal of reflector which may cause defect such as yellow marks or rust.

X. CONCLUSION

We can say that the above solutions are to be implemented. Advantages of using new schedule are as follows:

1. Productivity of the plant will be increased.
2. Accidental closer will be less.
3. Better quality check will automatically effect the production quality.
4. In the company with continuous individual observations of ultrasonic washing machine and phosphating machine we find small reduction in rejection in each individual stage
5. From the above observation we find that if we take the collective effect of both stages simultaneously we find satisfactory results
6. At the last collective observations we find reduction in rejection from 2.06 % to 1.23 %.

XI. FUTURE SCOPE

The above suggestions which are described above are helpful to improve the quality of Reflector in metalizing shop as well as in ultrasonic washing machine and automatic phosphating machine. By utilizing automatic metalizing chamber and low pressure zone the rejection may be reduced in future near about it. So in low cost we can achieve the better quality of the product at machine.

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References

[1] "ALMA Doubles its Power in New Phase of More Advanced Observations". ESO Announcement. Retrieved 11 January 2013
[2] "Parabolic Reflector Free Wi-Fi Booster". Do-It-Yourself Wireless Antennas Update and Wi-Fi Resource Center | Wi-Fi Wireless Q & A. Binarywolf.com. 2009-08-26. Retrieved 2012-11-08.
[3] "Slideshow: Wi-Fi Shootout in the Desert". Wired. 2004-08-03. Retrieved 2012-11-08
[4] About the company available on http://www.autolite.com
[5] http://www.integratedrobo.co.in/phosphating-process-plants.html pp. 162–164, Apollonius of Perga's Conica: text, context, subtext, Michael N. Fried and Sabetai Unguru, Brill, 2001, ISBN 90-04-11977-9.
[6] pp. 73–74, The forgotten revolution: how science was born in 300 BC and why it had to be reborn, Lucio Russo, Birkhäuser, 2004, ISBN 3-540-20068-1.
[7] "Archimedes' Weapon". Time Magazine. November 26, 1973. Retrieved 2007-08-12.
[8] p. 72, The Geometry of Burning-Mirrors in Antiquity, Wilbur Knorr, Isis 74 #1 (March 1983), pp. 53–73, doi:10.1086/353176.
[9] pp. 465, 468, 469, A Pioneer in Anaclastics: Ibn Sahl on Burning Mirrors and Lenses, Roshdi Rashed, Isis, 81, #3 (September 1990), pp. 464–491, doi:10.1086/355456.
[10] Chambers, Robert. A biographical dictionary of eminent Scotsmen. Google Books. Retrieved 2012-11-08.
[11] [McLean, Ian S (2008-07-29). Electronic Imaging in Astronomy: Detectors and Instrumentation. Google Books. Retrieved2012-11-08.
[12] http://www.nrao.edu/whatisra/hist_prehist.shtml
[13] [Fitzpatrick, Richard (2007-07-14). "Spherical Mirrors". Farside.ph.utexas.edu. Retrieved 2012-11-08.
[14] Fitzpatrick, Richard (2007-07-14). "Spherical Mirrors". Farside.ph.utexas.edu. Retrieved 2012-11-08.
[15] http://www.solarebruecke.org/index.php?option=com_content&view=article&id=2&Itemid=2&lang=en