

Table of Content

Chapter 1: INCOMING SAMPLES

Chapter 2: TESTING

Chapter 3: LAYOUT OF THE LABORATORY

Chapter 4: INFORMATION MANAGEMENT AND FIFO

Chapter 5: HOUSEKEEPING

Chapter 6: CONCLUSION

Chapter 1: INCOMING SAMPLES

a) Production line

Current situation: Samples are coming cut and weighted in small plastic box during day shift.
4 pieces: 1x Rheo # 1, 3x mould
“Strips” are not cut and weighted.

Proposal: Receive strip samples cut and weighted.
Do more testing and less cutting.

b) 60/140 and remixes

Current situation: Samples are thick and cold. Heating in laboratory oven (40-50 degrees) is necessary for swift cutting.
Piece of pre-cut rubber received: 1x Rheo # 2, 1x 60/140

process: 60/140 cut and organized → put in louvre bin → moulded → received mixed up → organized again → put in different box

Proposal: Use medium size grey plastic box instead of red louvre bin. Receive samples organized and save time needed for identification and sorting.

process: 60/140 cut and organized → put in medium size plastic box → moulded → received organized in the same box → box leaved in designated area by production operator

c) Labelling

Current situation: Label on 10-20 % of samples is not legible after moulding.
Black biro is time to time used, ink blends with carbon black.

Question: Are we buying black biros?

Proposal: Source larger labels and use blue biros only.

Chapter 2: TESTING

a) Rheometers

Current situation: Rheometer # 1 is used for samples coming from main production line, green rubber and accelerated batches.

Rheometer # 2 is used for remixes (sheets) only.
Machine is idle most of the day.

Proposal: Transfer some tests to Rheometer # 2, e.g. green stuff and accelerated batches in order to get more time for re sampling on Rheometer # 1.

b) Hardness

Current situation: Room temperature is not consistent, e.g. 14.9 degrees in Monday morning. Reading is interpreted in relation to temperature. Testing is thus subjective.

Hardness is checked on 3 samples, value for each sample is written down and mean value goes into summary line.
3 of 4 lines on form are kept blank except hardness test.

Proposal: Redesign RQTR sheet in order to have only one line for each batch. Calculate mean value without writing down and fill only in summary line. All batches will be on 1 sheet → less writing, more time for testing.

Question: Why we need measure on 3 samples for standard production when 1 is satisfactory in case that it is 60/140 sample?
Can we mould one disc from 3 pieces of rubber taken on 3 different places?

c) Resilience

Current situation: 3 samples per batch needed for resilience test. Each third batch tested in case that it is 60/140.

Proposal: Use first sample from batch 002 as third sample for batch 001, first sample from 003 as third sample for batch 002 during resilience testing.

d) Density:

Current situation: Tested on 1 sample per batch only.

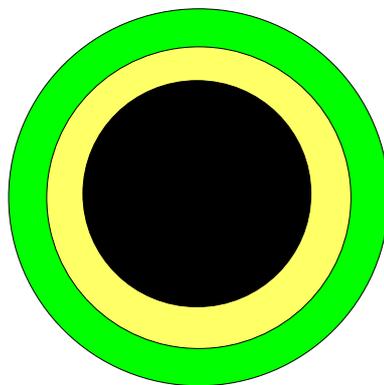
e) Tensile test

Current situation: 3 samples per batch tested, 1 can be invalidated → 2 rings needed

Question: Can we cut 2 rings with different diameter from one sample?
Can be SW set for ring with different diameter?
How long would changing/adjusting of clamps on tensile tester take?

Proposal: Mould only 2 samples per batch. Measure tensile strength on 2 rings only.
Cut smaller diameter ring in case that one of two standard size will break.

Picture: Green – ring used now, Yellow – smaller size “backup” ring,



f) Tear test

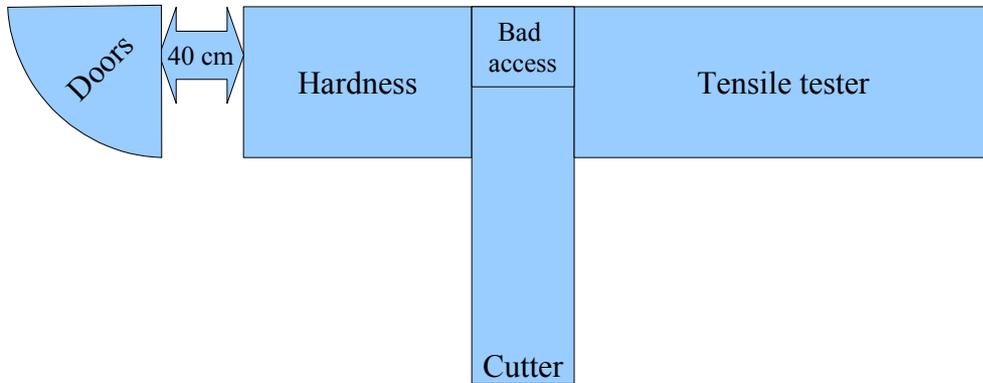
Current situation: Tested on 1 sample only, but paperwork and careful stacking of samples takes time. Test is subjective.

Question: Test simulate what will happen if large piece of rubber will be damaged.
Is it necessary to do this test for each compound?
Are all of them used for moulding of large objects?

Proposal: Recognize compounds which application demands known tear strength and test them only.

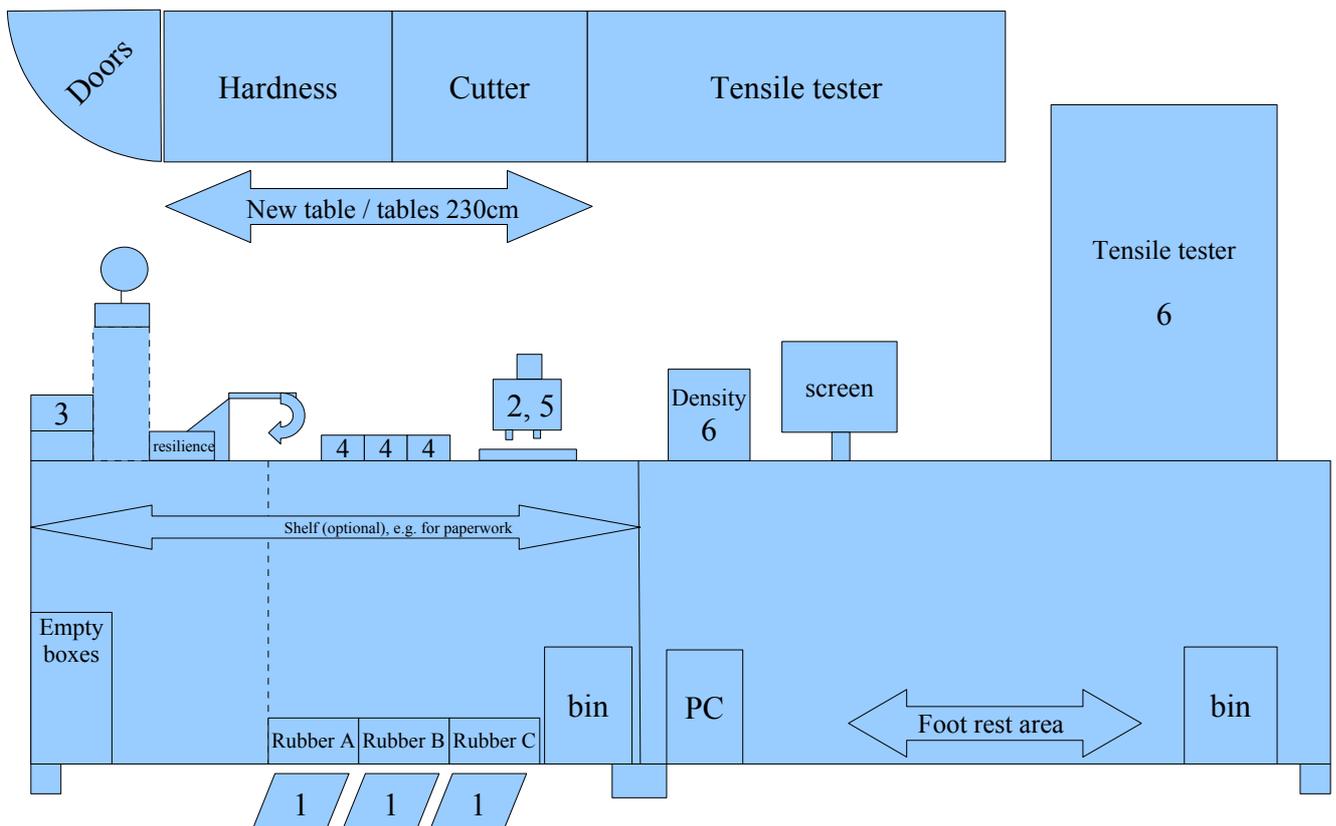
Chapter 3: LAYOUT OF THE LABORATORY

Current situation: Bottom part of tables are not used, middle table has area which is difficult to access.



Proposal: Get 2 shorter tables for hardness and cutter or one long and use bottom parts as much as possible. Create something like “production line” and pass samples in various stages of testing from left to right.

- Process:
- 1 – rubber cooling on the floor, then goes into large plastic box (A, B, C)
 - 2 – first cut, sorting by batch number, then goes into medium size plastic box (3)
 - 3 – labelled box containing samples awaiting hardness and resilience test
 - 4 – the same box containing RQTR and SPC sheet awaiting 2nd cut (5)
 - 6 – density and pull test



Chapter 4: INFORMATION MANAGEMENT AND FIFO

Current situation: People in the laboratory don't know about time when are results required in advance.
 Tasks are assigned randomly leading to situation where is around 10 batches in various stages of testing present in the laboratory, but none of them finished.
 Often changing of tasks and returning to unfinished testing cost precious time especially when are samples left on various places by various people.
 No one can say within 2 minutes which samples are in laboratory.

No handover between evening and morning shift, no morning meetings.

Example: KBC 70 op 264/E were moulded around 14:00. They were on the floor till 16:16 when we were asked if they are tested.
 I have spent time between 14:00 and 16:00 on remixes and by cutting of 60/40 samples. Michelle on rubber for Friday shipment.
 Both things could wait, but we didn't know about fact that KBC 70 is needed for next day morning.

Proposal: Use large white board when will be info about each rubber moulded in the laboratory.
 Beginning with First In First Out testing method in order to reduce average testing time per batch and reduce number of batches in laboratory.
 Patrick should identify priority items on the board.
 Production associate could write there when are result needed.

Date	Temperature	Compound	Batches	First in – Last in mould	Comment	Approved (tick)
15/11/10	20/160	KBC70op264/E	20-32	11:00 – 15:27	Needed for 18:00 today.	

Work day should start with briefing where will be clarified daily priorities, and whiteboard checked. Daily production forecast should be shown.
 Length: no more than 3 -5 minutes.

Chapter 5: HOUSEKEEPING

Current situation: Laboratory is messy. Samples are laying on the piles for weeks and no one has time to identify them. Looking for samples and making sure that we have them all takes 10-15% of work day.
Documents are kept on the bottom part of tables.

Cage with ACC batches in “Rubber on hold” area is overflowing.
How long will take to go through it and decide what to keep and what to dump?

Proposal: Keep all samples in the medium size plastic box (A5 size) together with documents.

Take colour adhesive tape and define areas for samples awaiting testing, 60/140 samples awaiting collection and for returned 60/140.

Get monster size paper sorter for Patrick in order to keep his desk clean.
Get plug for the sink instead of blocking the drain by paper towels.
Get sweeping brush and clean area on the end of each shift.

Fix spring in the doors near mould. They are opening and heat is escaping due to draught. Door closing mechanism would be ideal.

Wrap all ACC batches in plastic well and put sticker with clear identification on them. Attach clipboard on the cage and write what goes in.
Review content of the cage regularly.

Chapter 6: CONCLUSION

Main reason why is reflectivity of laboratory on the poor level is caused by chaotic organisation of work.
4 people are working in the area and they have not clearly defined goals.
Too many compounds is tested at the same time.

One weekend or couple of extra hours during week should be dedicated to sorting and testing of the numerous anonymous piles and when clean start with testing by FIFO.