

Manufacturing and THE NEED TO CHANGE

How To Save £1,000,000 – Part 2



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This report was written by:
MP
Atherton Management Services Ltd
Hindley Business Centre
Platt Lane
Hindley
WIGAN
WN2 3PA

1.1 INTRODUCTION

INTRODUCTION

Back in 1995 the “Open University and BBC Learning Zone” produced a TV program on **calculating volume**.

A Maths Question Was Asked:-

Based on the volume of the ice mass at the North Pole and South Pole...

- **What would be the rise in sea level if the ice melted...**

The Answer:-

- The ice floats on the **Arctic Ocean**. If it melted - **only the weather would be affected...**
 - **If the ice covering Antarctica melted, the sea level would rise about 60 meters (200 feet)...**
-

LEAN MANUFACTURING TOOLS

A Report: LEAN Manufacturing Tools. Techniques and how to use them to improve business and reduce the effects of Climate Change.

We all know now that Climate Change is an issue, this report illustrates a few things to think about in manufacturing in order to reduce Non-Value Waste and improve business...

ABOUT THE AUTHOR

The Managing Director of an **Industrial Engineering Consultancy**

- In the mid 1980s founded a company in **LEAN Manufacturing and Process Improvement**
- Now been working in manufacturing for over 30 years and in 60 cross-sector companies

A Designer of Factories, Process Improvement and Company Turnaround.

- Working predominantly in the UK, also Czech Republic, France, Netherlands, Ireland, Canada
- **During the last 15 years saving and generating for companies around £12 Million...**

During the period August 2018 – January 2019 worked in the **Netherland's, Arnhem**.

- Project **Company Turnaround** - Process Improvements and **Cost Savings circa £2,000,000**

My Job Is To Help People In Business - Improve Their Business... A Trouble-Shooter...

WHY WE NEED TO “CHANGE”

- Google - worldometer - “real time world statistics”.
- Google - the impact of sea level rise UK (images)
- Google - car free cities UK (images).

1.2 CLIMATE CHANGE

THE PROBLEM

We can see air pollution hanging over our towns, we can even smell the air pollution.

Causes Of Pollution

Industry - Manufacturing

Log Burners - Power Generation

Office Buildings - Household Boilers

Vehicles - Planes - Ships etc.

- But people “only talk about the problems of vehicle pollution”...
 - PEOPLE DON'T TALK ABOUT A SOLUTION or HOW TO IMPLEMENT A SOLUTION..
-

SO: WHAT DO WE DO ABOUT IT, NOW...

- Option 1 – Do nothing, and hope it will go away
- Option 2 – Talk about it, and hope it will go away
- Option 3 – Talk about it, and hope someone else will do something about it
- Option 4 – Talk about it, Talk to other people, AND DO SOMETHING ABOUT IT...

SO: OPTION 4...

- What are we going to do about it - And “LETS THINK OUTSIDE THE BOX”

What Can We Do In Manufacturing ?
Can You Generate £1,000,000 From Process Improvement

One Of The “Root Causes” Waste



“EFFECT”

(The World Under Water)



CLIMATE CHANGE

**THE PROBLEM
and
THE OPPORTUNITY**

IS THE FUTURE **SO** BLEAK

2.1 PRODUCT DESIGN and PRODUCT VARIATION

THE PROBLEM

Every year we get new designs and new products...

- But: Do designers think about how the product will be manufactured...
- But: Do designers think about who will use these products...
- **Cables Too Short 1.8m** - so the hair dryer does not reach the head...
- **Electrical Plugs Too Small** - so cannot be pulled out of the socket...
- **Too Many Variations of Products** - £29, £39, £49, £69... WHY ?
- **Thousands of Printer Inks** - **for just 6 colours**... WHY ?
- **Endless Variations of Cordless Phones**... WHY ?



ENDLESS VARIATION

- **Endless Variation – Slows down production**
- **Endless Variation – Reduces Productivity**
- **Endless Variation – Increases Costs**
- **Endless Poor Design – Reduces confidence in a company**
- **Endless Poor Design – Reduces company sales**
- **Endless Poor Design – Reduces profits**
- **Endless Choice – Confuses the Customer**
- **Endless Choice – Reduces Sales**
- **Endless Choice – Reduces Profits**

THE OPPORTUNITY

- ✓ **SIMPLIFY** - The Design
- ✓ **STANDARDISE** - The Parts
- ✓ **REDUCE VARIATION** - Of The Product
- ✓ **Design products and services to meet customers' needs.**
- ✓ **Put your customers' needs first - rather than to competitive pressure.**

THE BENEFITS

1. **REDUCED COSTS**
2. **INCREASED SALES**
3. **INCREASED PROFITS...**

2.2 PRODUCT DESIGN and MIXED MATERIALS

THE PROBLEM

If we look at the car industry;

We find many of the car design features are of mixed materials...

- **Aluminium** is often moulded to plastic...
- **A Car Fascia**; often has a **Wooden Veneer** moulded to **plastic.>>>**
- **Car Side Panels**; on some SUVs have **Carpet** moulded to **plastic...**



Car Fascia Panel
Wood Veneer
moulded to plastic

BY MIXING MATERIALS:

The problem with mixing materials;

They cannot be separated, so rejects can end up in land-fill...

- The manufacturing process can suffer...
- Quality of the product can suffer...
- Business profits WILL suffer...
- What is the cost to the environment...
- What is the cost to the company in rejects...
- What is the cost to the company in over-processing...
- What is the cost to the company in Lost Profit...



Car Side Panel
Carpet
moulded to plastic

THE OPPORTUNITY

1. Don't Mix Materials:

- It will cost more to dispose of waste and scrap
- Scrap will reduce the companies business profits
- Gas and Electricity will be wasted in re-making parts

2. Don't Over Design Products:

- Over designing will slow down production
- Over designing will cost more to manufacture
- Over designing products will cost the company in TIME

3. Don't Complicate the Process:

- Employ – Quality Awareness Training
- Employ – LEAN Manufacturing Principles
- Employ – SIMPLE, STANDARDISE, REDUCE VARIATION

2.3 PRODUCT DESIGN and LAND-FILL

PRESENT PROBLEM

Today we just take things for granted - But at what cost to the environment ?

- What will happen to product at End-Of-Life ?

CONSUMABLES

Plastic Trays used for fish and chips. Go to Land-fill or end in the sea...

1. **DO NOT use Plastic Trays...**
2. **Wrap chips in paper or Cardboard Trays...**



PACKAGING

Plastics.... WHY ???

1. Lack of "balls" by the supplier to talk to the customer...
2. We need to use recycled and recyclable materials...



THE OPPORTUNITY

**Are we going to continue killing the creatures in the sea with our waste.
Or are we going to use recycled and recyclable materials.**



2.4 PRODUCT DESIGN - DO's and Don'ts

THE PROBLEM

Designing a printer, a phone, electric heater, jeans, socks, a television or a car, is about:

- Designing something that will catch the customers eye...
- Designing something that the customer “wants”...

DON'T

- Don't design something that is not Fit-For-Purpose – Or Difficult to use...
- Don't design something where cables are too short – e.g. Hairdryer cable less than 2.0m
- Don't design something too small to handle – e.g. A plug that cannot be pulled out of a socket
- Don't design something with Mixed-Materials – it will create more rejects
- Don't design something with too many process stages – it will reduce productivity
- Don't design something with too many raw materials – it will reduce business profits
- Don't design the same thing, where there are too many variations - £29, £39, £59, £79
- Don't design something without thinking about the end-user – 2 years old – 70yrs - disabled.
- Don't design something that cannot be recycled or up-cycled at End-of-Life...

**If Something Is A Good Seller or A Good Product
DON'T RE-DESIGN IT**

Fashion might sell - But Not everyone is into fashion

THE OPPORTUNITY - DO

Edwards Deming said:- Adopt the new philosophy.

1. Design products and services to meet customers' needs.
2. Put your customers' needs first - rather than competitive pressure or trends.
3. Create your quality vision, and implement it – “Fit For Purpose” Not cheap and nasty.
4. Provide support and resources so that production levels and quality are achievable.
5. Look at how the process is carried out – Not just numerical targets.
6. REDUCE VARIATION - INCREASE PRODUCTION - INCREASE SALES - INCREASE PROFIT

2.5 REJECTS and SCRAP

PRESENT PROBLEM

Today we keep insisting on a 100% quality item, but at what cost to the environment.

- Why do we design products so badly - 50% ends up being scrapped...
- Why do we design complicated products – it makes the product more costly...
- Why do we design products with “mixed materials” – rejects make more land-fill...

This is what happens in manufacturing when something is not 100%



Rejected Car Doors



Rejected Car Parts



Over Production



Rejected Car Parts



No Respect For Quality



No Respect For Product

2.6 QUALITY STANDARDS

PRESENT PROBLEM

In manufacturing rejects and scrap can be 10 – 20%... Even 50% or 100%

1. This is a door panel from a car.
 - A Carpet moulded onto plastic.
 - **This part is "Short Moulded" - No-one will see**
 - Rejects go to landfill.

So WHY Reject it... If no-one will see it...



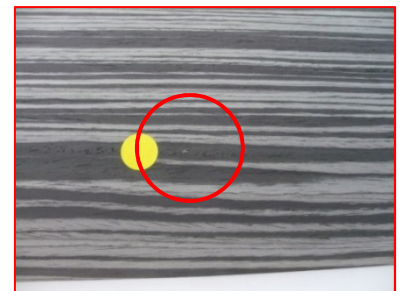
2. These are 2 moulded bottles.
 - **White and not quite white - One will be rejected.**
 - People are buying the contents of the bottle.
 - Not In the dynamics of the container.

So WHY Reject it... With coloured liquid in, you won't see it...



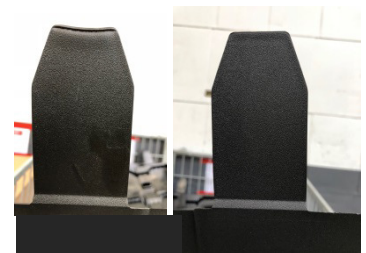
3. This is part of a door panel of a car.
 - Wood Veneer moulded onto plastic.
 - **A natural spot in the veneer - No-one will see**
 - Rejects go to landfill.

So WHY Reject it... If no-one will see it...



4. These are moulded parts for a lorry.
 - A slight curve in the mould - One will be rejected.
 - **A moulding issue - No one will see**
 - Rejects go to landfill.

So WHY Reject it... If no-one will see it...



5. **People BUY Crisps - Not the COLOURED packaging**
-

100% Red or 96% Red
Does it really matter...

We Need To Cut Land-fill

THE OPPORTUNITY

- ✓ We need to reduce rejecting good product...
- ✓ We need to reduce putting good product to land-fill...
- ✓ **We need to Talk to the Customer – What Quality Standard is Acceptable...**

2.7 MANUFACTURING

THE PROBLEM

POLLUTION “DOES NOT JUST COME FROM CARS”...

➤ The trouble is, people ‘only talk about the problems with cars’

Pollution also comes from Industrial Processes and Non-Value Waste

Non-Value Waste - the problem is:

When you have a problem with Non-Value Waste or Rejects you are going to lose production. You are going to lose money...

POOR PROCESS CONTROL

Rejects and Scrap come from poor process controls

- Lack of Planned Maintenance
- Lack of Working Standard's
- Lack of Time Standard's
- Lack of Operator Training
- Lack of Quality Awareness
- Lack of Plant Investment £££

THE OPPORTUNITY / To Do:

1. Total Planned Maintenance
2. Effective Production Planning
3. Effective Cycle Time Standards
4. Inventory / Parts Organisation
5. Operator Training / 7S Awareness
6. Investment in “Low Energy Use Plant”



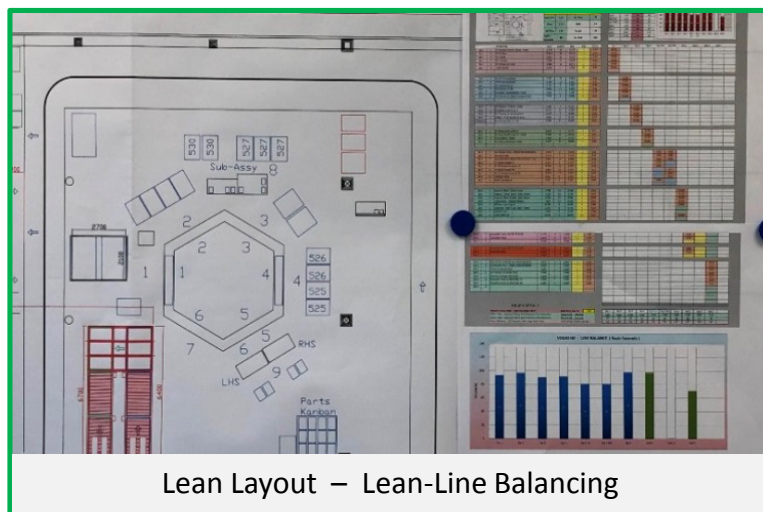
Lack of Investment



Good Process Design



Good Inventory Organisation



Lean Layout – Lean-Line Balancing

2.8 PROCESS DESIGN

PROCESS DESIGN

This page is dedicated to designing the process...

- *Do designers and engineers “think through the process”*
- *Is the jig or fixture design giving “Right First Time”..*
- *Is the process giving maximum production...*

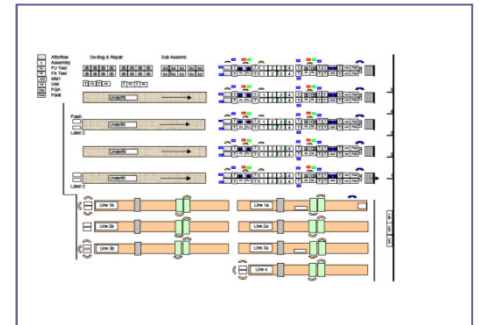


1. Manufacturing - Jig Design

- Designing Jigs can make the difference between profit and loss
- E.g. 3 Jigs making the same product – however 3 different shapes
- Potential Savings on Standardisation – £210k on reduced rejects

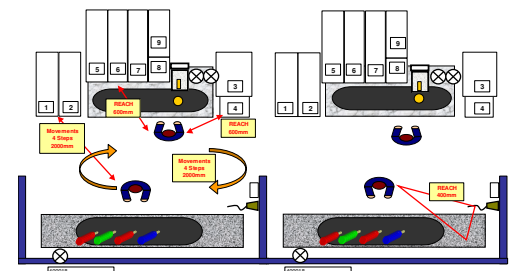
2. Manufacturing - Process Design

- Designing a process or assembly line is important
- Time and Motion – Line Balancing – Single Piece Flow
- Potential improvement from 12,000 to 22,000 building 24/7
- Potential Business Improvement circa \$300M



3. Manufacturing - Assembly Cell Design

- Designing an assembly area well, can improve productivity
- An ergonomically designed cell, can maximise production
- An organised W.I.P. and Kanban, can reduce down-time
- E.g. Potential Production Improvement here = 41%



THE OPPORTUNITY

- Analyse the Opportunity
- Analyse the Jigs and Fixtures
- Analyse the Method of Production
- Analyse the Time Taken to Manufacture
- Analyse the Floor Space...
- Analyse the Quality...
- Benefit from “Change”

The Competitive Elements

Small change, Big impact...



2.9 PROCESS CONTROLS

PRESENT PROBLEM

Today we keep insisting on a 100% quality item, but at what cost to the environment.

Companies make product and then reject it, if it is not 100%.

- We need to look at the process and ask why rejects are produced
- We need to look at the machines and ask why rejects are produced

Most times there is human intervention and machines are not set correctly.

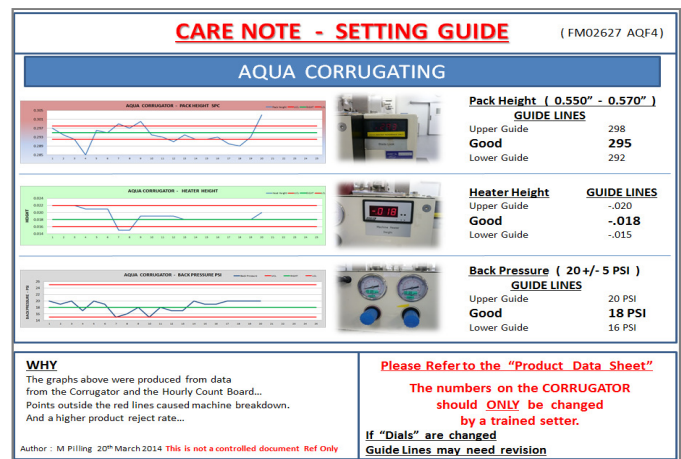
SO: We need to introduce

1. **Data Collection and Analysis**
2. **Quality Standards**
3. **Work Procedures...**

SPC Statistical Process Control

SPC is the use of data to control a process or production method. SPC tools can help monitor process or machine behaviour to find production solutions or quality issues.

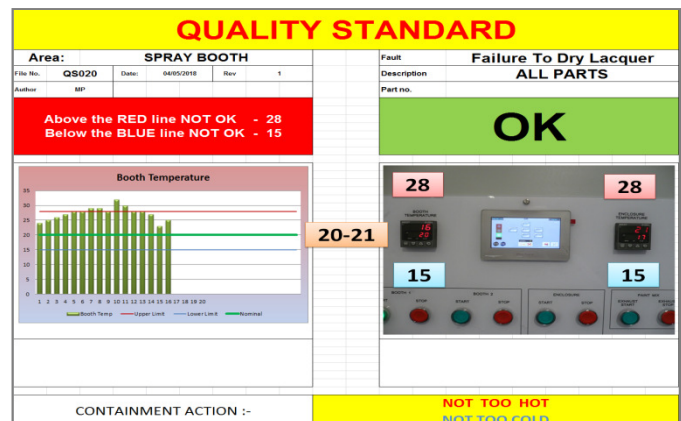
✓ Potential Saving here circa £90k



Quality Standards

These can be written in many forms.

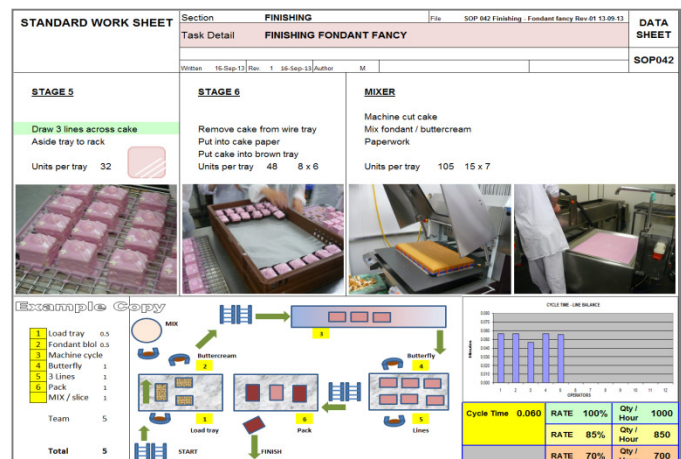
- Best ones are written simply...
- People need to understand the process.
- People need to understand what is required from quality...
- Quality Awareness Training needs to be introduced...



Standard Operation Procedures

These can be written in many forms.

- Best ones written simply...
- Easily understood...
- TAKT Time Controlled...
- Line Balanced Operation...



2.10 PLANT and EQUIPMENT

THE PROBLEM

When we buy a car we tend to service it occasionally...

However, in manufacturing we tend to wait till the machine breaks down...

Breakdowns - the problem is:

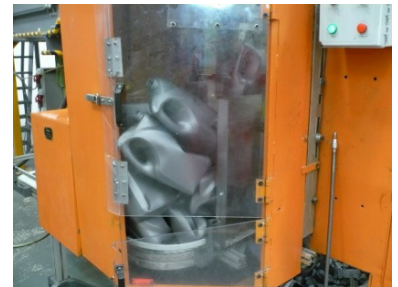
When you have a problem with breakdowns or stoppages you are going to lose production. You are going to lose money...

POOR PROCESS CONTROL

- Endless machine stoppages
- Ineffective machine repairs
- Plant NOT up-to speed
- Lack of housekeeping
- Lack of plant organisation
- Lack of Plant Investment £££

THE OPPORTUNITY / To Do:

1. Total Planned Maintenance
2. Effective Production Planning
3. Inventory / Parts Organisation
4. Effective / Regular Housekeeping
5. Operator Training / 7S Awareness
6. Investment in "Low Energy Use Plant"



Lack of Maintenance



Lack of Maintenance



Lack Of House-Keeping



Lack of Discipline



2.11 TOTAL PLANNED MAINTENANCE

THE PROBLEM

When machines breakdown – they are repaired (eventually).

- But how much production is lost due to machine stoppage...
- What is the cost of lost production...



Downtime 6 hours
Production loss 6 hours



Downtime 4 hours
Production loss 4 hours

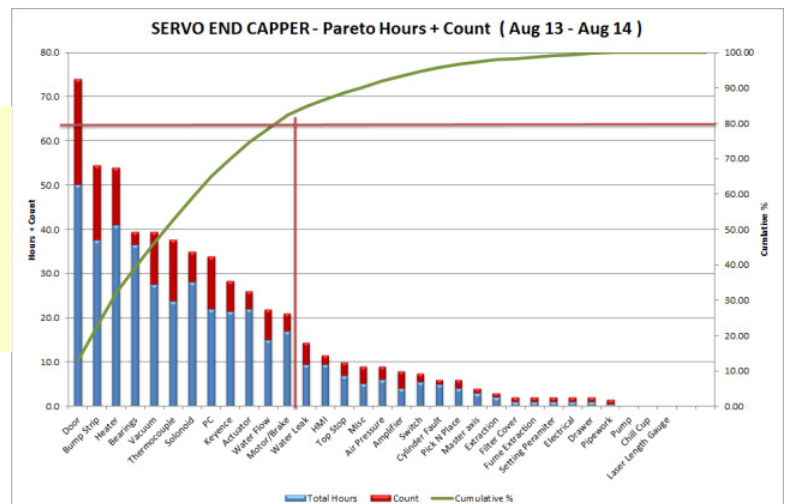
THE OPPORTUNITY

So, what can be done:

1. 'TPM' Total Planned Maintenance
2. 'OEE' Overall Equipment Effectiveness
3. 'SMED' Single Minute Exchange of Die.
4. 'SPC' Statistical Process Control



Pareto Data Capture and Analysis



THE BENEFITS

1. REDUCED COSTS
2. INCREASED PRODUCTION
3. INCREASED PRODUCTIVITY
4. INCREASED COMPANY PROFITS...

2.12 OPPORTUNITY and BUSINESS GROWTH

PRESENT PROBLEM

It seems to me that in the food industry, when more product is required - more people are thrown at the production line.

But this is not always the way to go...

Lets think about 2 Business Improvement Techniques:-

1. **LEAN Manufacturing Principles**
2. **Time and Motion**

Lets think about implementing these techniques:-

We are Packing Cream Cakes...

Product Running 40hrs/wk – 52 wks/yr.

1. Lets run 3 production lines, 36 people
 - 12 people per line packing 1260 / hr. at 70% perf.
2. Lets now apply LEAN “Flow-Line Balancing”
 - 8 people now packing 1800 / hr. at 100% perf
3. Lets now run 4 lines instead of 3 lines
 - 8 people per line + a runner = 36 people

Sales Generated from Process Improvement = circa £2.5M



THE ACTION PLAN

We Have To
Build A Better World

WE CAN HAVE OUR CAKE AND EAT IT...



3.1 THE OPPORTUNITY

THE OPPORTUNITY

1. SIMPLIFY -
2. STANDARDISE -
3. REDUCE VARIATION

PLASTICS

Plastic comes from OIL – That is now a finite resource...

- Sea fish are dying because of plastic in their gut...

TO DO LIST

1. **Simplify Product Design** - save on material costs
2. **Standardise Product** - increase company profits
3. **Reduce Variation** - increase company sales
4. **Use sustainable and Re-cycled materials**

THE OPPORTUNITY

INSTEAD OF REJECTING GOOD PRODUCT ...

1. TALK TO THE CUSTOMER...

- a) What Quality Standards are Acceptable...*

2. IMPLEMENT QUALITY AWARENESS...

- a) Write and Use SIMPLE – Standard Operation Procedures ...*
- b) Invest in Operator Training – Quality Standard Awareness...*
- c) Reduce Non-Value Waste – Increase Productivity and Profits...*

3.2 IN CONCLUSION - THE ACTION PLAN

IN CONCLUSION

I don't have all the answers. But we can do something...

SO WHAT ARE WE GOING TO DO ABOUT IT ?

What Can We Do In Manufacturing ?






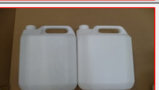

✓ £1,000,000 Savings Can Be Achieved...



Are we the “Last Generation To Do Nothing”

Or are we the generation to do something...

To create clean growth and a clean Earth for our children's children...

10 POINT PLAN	OPPORTUNITY	PRESENT ISSUE	FUTURE ACTION
1 	Management Controls	SAME PROBLEMS Day after Day	Implement LEAN Process Improvements Eliminate Non-Value Waste
2 	Process Control	Present State WHAT - WHERE - WHEN HOW - WHO - TIME	Map The Present LEAN Process Improvements Control The Process
3 	Product Design	TOO MUCH PRODUCT VARIATION	Talk To The Design Team Simplify - Standardise Reduce Variation
4 	Process Methods	NOT LEAN	Introduce LEAN / 7S / TPM
5 	Product Quality	REJECTS AND SCRAP	Investigate Methods Investigate Operator Training Investigate Machine Operation
6 	Product Quality	SHORT MOULDING	Talk To The Customer Review What Is Acceptable Review Quality Standards
7 	Product Quality	PRODUCT VARIATION	Talk To The Customer Review What Is Acceptable Review Quality Standards
8 	Plant & Equipment	MACHINE BREAKDOWNS	Review OEE Root Cause Analysis Implement Total Planned Maintenance
9 	Energy Waste	HOW DO WE REDUCE CARBON EMISSIONS	Improve the Lighting (LED) Switch OFF - If not in use
10	Environmental	DESIGN OUT END-OF-USE LAND-FILL... RECYCLE - RE-USE - UP-CYCLE	DESIGN PRODUCT Using Natural Resources PAPER - WOOL - COTTON Sand For Glass