

# The Road to Reliability™

A simple 4-Step approach to reduce  
your downtime by 90%



[www.roadtoreliability.com](http://www.roadtoreliability.com)



# Introduction

Thank you for downloading the Road to Reliability™ Roadmap. In this guide I will give you a high level overview of the four practices you need to master to reduce your equipment downtime by up to 90%. And when you do so, you will also reduce your maintenance costs and improve your safety record.

The framework I will introduce is founded in some of our industry's best research and will work even in the most reactive environments. It's not something I've invented out of nowhere. I have summarized the research of some of the industry's most renowned experts and condensed it into a simple, practical model that everyone can understand. A framework that everyone can implement. A framework that works.

I call it the **Road to Reliability™**.

I hope you enjoy reading this guide and wish you all the best on your own journey down the Road to Reliability™.



**Erik Hupjé**

Managing Director at R2 Reliability Ltd.



# The Road to Reliability™

There are many frameworks in use for achieving reliability. I believe that most of the frameworks used in industry are unnecessarily complicated. We've all seen the temples or pyramids with 10 or 20 acronyms short for one or the other complex process that we must master to achieve reliability.

But must we really? In my experience the "Best of the best" achieve world class reliability by doing the basics really well. And industry research shows the same.

Research done in the 1990's across a very large group of manufacturing sites around the world found that reactive plants typically achieved uptime of around 83.5%.

That same research found that the best performing manufacturing sites achieved uptimes in excess of 98% by focussing on planning & scheduling, preventive and predictive maintenance and defect elimination. This research, spearheaded by Winston Ledet, lead to the development of the Manufacturing game and multiple publications.

The table below summarizes the findings of this research:

Tactic	Uptime % change	Uptime	Downtime Reduction
<b>Reactive Plants</b>		<b>83.5%</b>	
Planning Only	+0.5%		
Scheduling Only	+0.8%		
Preventive / Predictive Maintenance only	-2.4%		
<b>All Three Tactics</b>	<b>+5.1%</b>	<b>88.6%</b>	<b>30.9%</b>
<b>Plus Defect Elimination</b>	<b>14.8%</b>	<b>98.3%</b>	<b>89.7%</b>

These results are somehow not widely known in industry – to our detriment – but worse, the table above that summarises the results of Ledet's research is often misunderstood and therefore dismissed as incorrect. So let me explain.





# Understanding the research that underpins the Road to Reliability™

When industrial plants with a reactive maintenance culture implemented only Planning their uptime improved on average by 0.5% (to 84.0% from 83.5%) <sup>1</sup>

When industrial plants with a reactive maintenance culture implemented only Scheduling their uptime improved on average by 0.8% (to 84.3% from 83.5%) <sup>2</sup>

When industrial plants with a reactive maintenance culture implemented Preventive Maintenance only their uptime decreased on average by 2.4% (to 81.1% from 83.5%) due to the additional downtime to conduct preventive maintenance work. <sup>3</sup>

When industrial plants with a reactive maintenance culture implemented all three tactics of Planning, Scheduling and Preventive Maintenance their uptime increased on average by 5.1% (from 83.5% to 88.6%) <sup>4</sup>

Industrial plants that practiced Planning, Scheduling, had a Preventive Maintenance Program and had implemented Defect Elimination increased uptime by 14.8% (from 83.5% to 98.3%) <sup>5</sup>

Industrial plants that practiced Planning, Scheduling and had a Preventive Maintenance Program and also had implemented Defect Elimination had on average an uptime of 98.3% <sup>6</sup>

Industrial plants with a reactive maintenance culture were found to have on average an uptime of 83.5% <sup>10</sup>

Industrial plants that practiced Planning, Scheduling and had a Preventive Maintenance Program, but no Defect Elimination had on average an uptime of 88.6% <sup>9</sup>

Industrial plants that practiced Planning, Scheduling and had a Preventive Maintenance Program experienced 30.9% less downtime compared to reactive plants. <sup>8</sup>

Industrial plants that practiced Planning, Scheduling, had a Preventive Maintenance Program and had implemented Defect Elimination experienced almost 90% less downtime compared to reactive plants. <sup>7</sup>

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<b>Reactive plants</b>		<sup>10</sup> <b>83.5%</b>	
Planning only	<sup>1</sup> +0.5%		
Scheduling only	<sup>2</sup> +0.8%		
Preventive / Predictive Maintenance only	<sup>3</sup> -2.4%		
<b>All three tactics</b>	<sup>4</sup> <b>+5.1%</b>	<sup>9</sup> <b>88.6%</b>	<sup>8</sup> <b>30.9%</b>
<b>Plus Defect Elimination</b>	<sup>5</sup> <b>14.8%</b>	<sup>6</sup> <b>98.3%</b>	<sup>7</sup> <b>89.7%</b>

What this shows is that the plants with high uptime achieved this by implementing planning, scheduling, preventive and predictive maintenance and defect elimination.

And - in hindsight – this makes perfect sense. You need planning & scheduling to enable efficient and effective maintenance. Without planning & scheduling you will find yourself with unnecessary long machine and plant outages.

And you need both elements combined; planning or scheduling on their own do little to drive efficiency. Planning reduces delays during jobs and scheduling reduces delays between jobs. One without the other simply won't work.

Preventive maintenance (PM) and predictive maintenance (PdM) are essential to increasing uptime. They enable you to prevent failures or detect them early so rectification is quicker, less costly and with less impact on overall availability.

And the **biggest finding from the research was the impact of Defect Elimination**, which in essence is making sure 'you fix forever, rather than forever fixing'.

So when something fails you make sure it does not re-occur

and so over time you reduce the number of failures and increase your uptime.

What is may be surprising is the big impact Defect Elimination has on overall uptime. This tells us that all our plants are full of (hidden) defects that result in failures. You see, we introduce defects at every stage of a plant's lifecycle. During the design, construction, commissioning of our plants but also during the operation and maintenance phases. If you don't tackle these defects they eventually lead to failures.

Maintenance doesn't address defects and good maintenance can only help you to achieve your plant's inherent reliability. So you need a defect elimination program to remove defects to achieve high reliability. To fix forever rather than forever fixing.

My model for achieving reliability adds one more element to the equation and that is Leadership & Culture.

And that's because I know from experience that without leadership you'll get nowhere. And without Culture you won't sustain your improvements.

# Keeping it simple

I refer to my model as the Road to Reliability™ and it comprises of just 4 Essential Elements:

1. **Planning & Scheduling**
2. **Defect Elimination**
3. **Preventive Maintenance**
4. **Leadership & Culture**

Implement these 4 practices really well you will make tremendous improvements in your business. You will increase reliability, production, profits and safety.

Adopt an overly complicated approach like you commonly see in industry and you lose sight of the essential basics.

I've seen it so many times, companies focus on too many things or the wrong things and lose their way on the Road to Reliability™.

Most of these companies eventually give up on their reliability improvements and simply accept the status quo. They accept poor reliability.

But our Road to Reliability™ shows that it doesn't have to be that way.

It doesn't have to be complicated. In fact it's really quite simple. But make no mistake, travelling the **Road to Reliability™** will take a lot of hard work and commitment.



# The Road to Reliability™ Framework

There are many frameworks for reliability improvement. Most are unnecessarily complicated. The best performing plants in the world are the best, because they focus on the few basics that really matter. We have created a simple, yet proven framework to improve reliability focusing on **4 Essential Elements**.

Increase your maintenance workforce by 35% without hiring anyone. Reduce costs, improve safety and increase morale.

80% of failures that occur in a plant have occurred before. Fix them forever and stop forever fixing



40% - 60% of PMs add little value. Learn how to eliminate them to reduce work-load, reduce costs and increase uptime.

70% of change initiatives fail. Without Leadership you'll get nowhere. Without Culture you won't sustain anything.

# First: Make a start

The **Road to Reliability™** is in many ways like every long journey. It starts with just a single step forward.

You take that step the day you've had enough. The day you are finally so dissatisfied with the fire fighting, chasing emergency after emergency that you decide to do whatever is necessary to get yourself out of this mess.

And as with every long journey you need to know your destination and have a map to get you there. And that is exactly what this roadmap shows: The **Road to Reliability™**.

Take it. Use it. And get going!

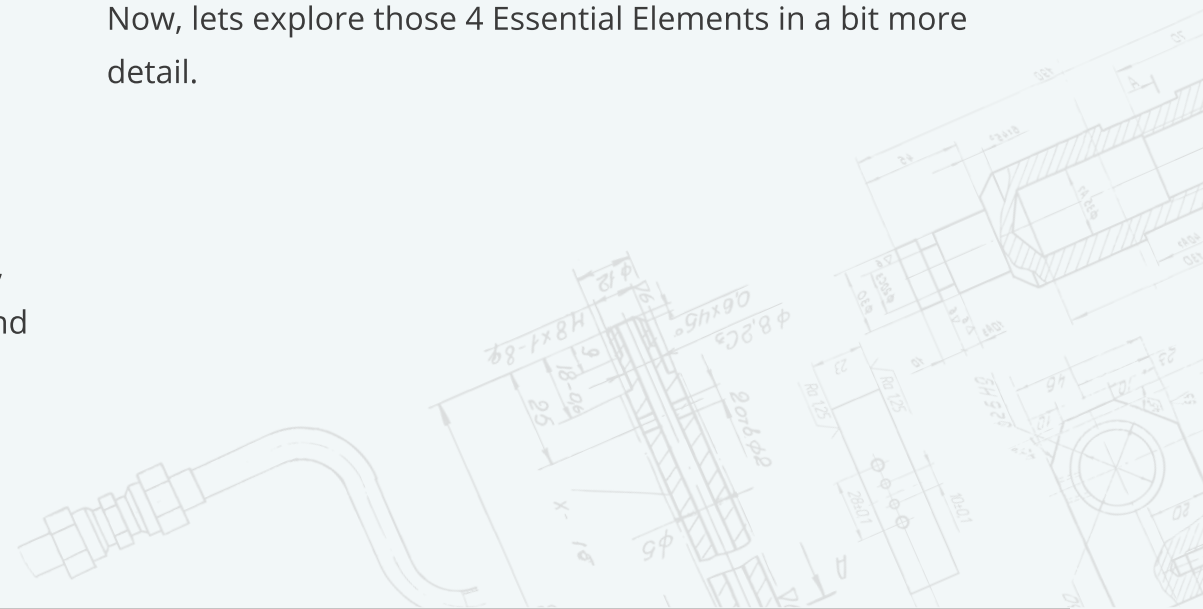
Just remind yourself, this is very much a journey, a marathon, and most certainly not a sprint. It will take time, dedication and persistence.

And yes, everybody's **Road to Reliability™** is different.

But what I do know is that everybody who has made significant progress down the **Road to Reliability™** will have implemented these **4 Essential Elements**.

What order you tackle these in depends on where you are today. And what is holding you back the most. The best way to determine that is to do a simple self-assessment or get someone to help you with that and then determine a way forward.

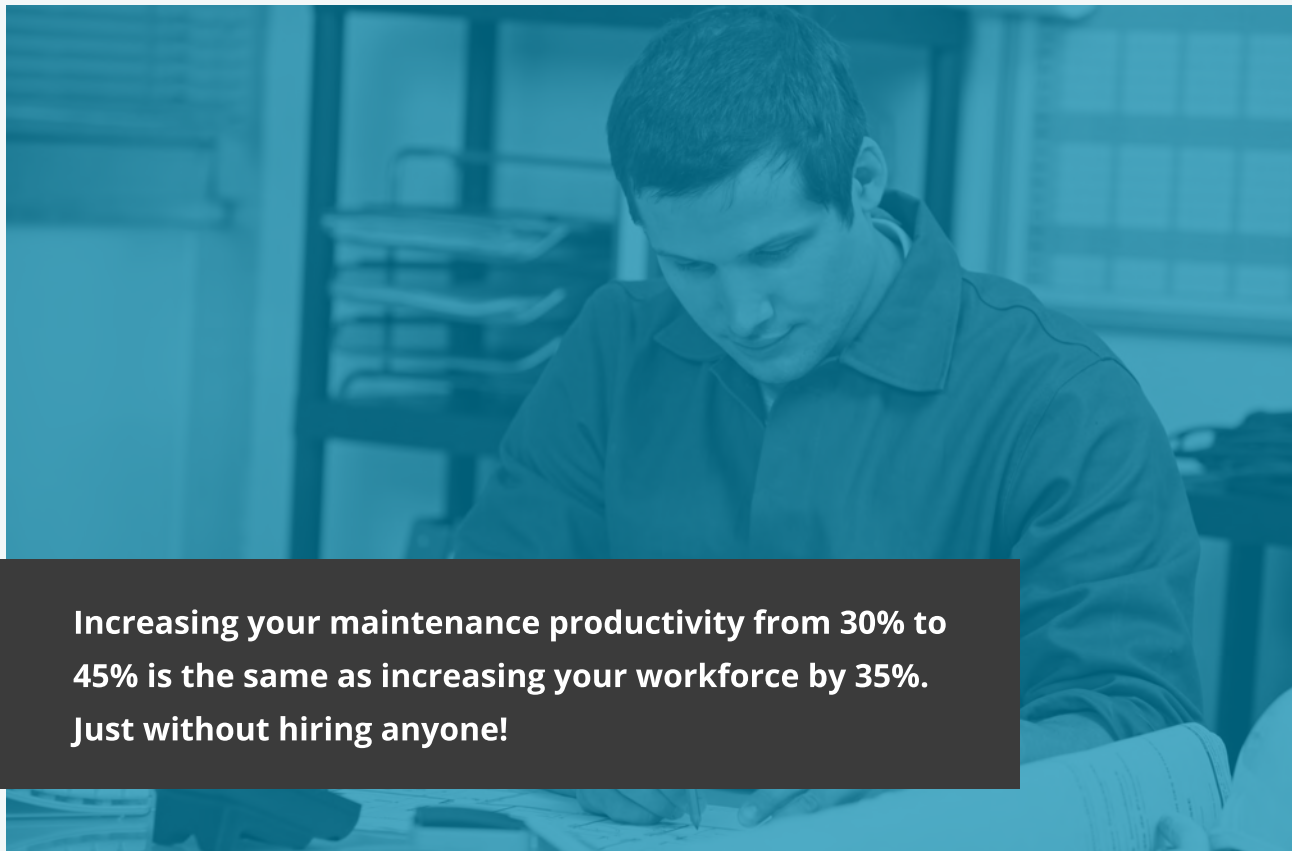
Now, let's explore those 4 Essential Elements in a bit more detail.





# Planning & Scheduling

Soon after you make that first step you will need to implement a Planning & Scheduling process. Planning & Scheduling is all about maximizing your maintenance productivity by ensuring the right work gets done, at the right place and time, with the right tools, materials and people.



**Increasing your maintenance productivity from 30% to 45% is the same as increasing your workforce by 35%.  
Just without hiring anyone!**

No matter what studies or benchmarks you look at, they all show that typical maintenance productivity or wrench time is somewhere around 30%. With proper maintenance planning and scheduling you can drive this to 45% and the Best of the Best achieve 50% - 55%.

Getting Planning & Scheduling in place and working well is a critical step in fighting your reactive work environment. It will finally create some space in people's busy schedule for proactive activities.

It will help you to stabilize your working environment so you can get ready for your next step on your journey to high reliability. Unfortunately few organisations get this right. But it really isn't that hard.

## Want to find out more? Check out these online articles:



### **How to sell planning and scheduling to your CEO**

Many implementations of Maintenance Planning and Scheduling fail. Often because senior management was never on board to begin with. In this article, ...

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### **Without planning and scheduling you will fail**

Maintenance Planning & Scheduling is one of the 4 Essential Elements on the Road to Reliability™. Planning & scheduling, or work management...

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### **How to implement maintenance planning & scheduling**

Most organisations that implement maintenance planning and scheduling do not achieve the long-term results they expected.

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# Preventive Maintenance

With Planning & Scheduling under your belt and Defect Elimination well and truly under way you will soon find gaps in your Preventive Maintenance (PM) program – if you haven't already. Experience shows that up to a third of the tasks in most PM programs add no real value. Another third would usually benefit from a change of frequency. And we haven't even talked about the quality of the work instructions!

Simply put, most Preventive Maintenance programs are not very effective and waste a lot of time and money.

But before you tackle your PM program you need to make sure you understand the principles of modern maintenance. You need to understand what Reliability

Centered Maintenance has taught us. Understanding the different failure patterns and how to manage these with PM tasks – or not – is the key to building an effective and economical Preventive Maintenance program. So often I see organisations react to equipment failures or poor reliability by adding more preventive maintenance. And more often than not, more Preventive Maintenance does not help. In most of these cases more PM's do not increase reliability or reduce failures. What it does do, is increase your costs and it can reduce availability.

Although the principles of RCM have been round for 40 years, most organisations and maintenance teams can't seem to effectively apply these principles in their work practices. But



with a bit of effort and probably some training you can soon apply these principles in your organisation so you can do less preventive maintenance yet achieve higher reliability.

## Want to find out more? Check out these online articles:



### **9 Principles of a modern preventive maintenance program**

In this article, I provide a brief history of the development of Reliability Centered Maintenance (RCM). And from there we explore 9 Principles of a Modern...

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### **Why the FMEA is my equipment not reliable?**

Failure Modes and Effects Analysis – or FMEA for short – is widely used across many industries. Often in the design phase of new equipment.

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### **How to improve your preventive maintenance program**

Few organisations have effective preventive maintenance programs. Most PM programs are wasteful, many are ineffective.

[Coming soon](#)



# Defect Elimination

Once you have implemented Planning & Scheduling you will start to see the amount of unplanned work reduce. As you create a more stable work environment, with better planned work, and a sound Weekly Schedule you will find time to think ahead. As soon as this happens you need to take your next major step forward and implement Root Cause Analysis and Defect Elimination.

**Root Cause Analysis is all about preventing problems from reoccurring. It's about getting rid of the 20% of issues that cause 80% of your breakdowns, downtime, corrective maintenance and repair costs.**

When you encounter a significant breakdown you analyse the failure, determine the root cause and resolve it. You fix it once

and for all. Rinse and repeat. So whilst Root Cause Analysis is all about removing the big ticket items you also need a process for eliminating the smaller, niggly little things.

Because in just about every plant around the world, the little issues add up to a lot. This is where Defect Elimination comes in. Defect Elimination aims to empower your front line and the wider support teams to independently tackle the many small issues that cause failures. The beauty of Defect Elimination – when it's done well – is that it drives you towards a Reliability Culture in several ways.

It removes defects and makes your plant more reliable. But it is also the vehicle to engage a large part of your organisation in reliability. To make reliability everybody's responsibility – just like safety.

## Want to find out more? Check out these online articles:



### **Defect Elimination why you can't do without**

With the Road to Reliability™ Framework you can reduce your downtime by 90%. And although you need all 4 Essential Elements to...

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### **What effective Defect Elimination looks like**

One of the most powerful ways you can improve the reliability of your plant is by implementing an effective Defect Elimination program. But what does...

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### **How to implement Defect Elimination**

Knowing that Root Cause Analysis and Defect Elimination are critical to your reliability success is one thing. Implementing them successfully and sustaining the change in the long run is

**Coming soon**

# Leadership & Culture

When you've come this far in your journey, plant availability is way up, productivity is high and the defects that pop up are effectively addressed.

You, and the people around you, enjoy work more with so much less frustration. And have you've noticed that the number of times people getting hurt has reduced too – when did that happen?

But, by now you'll have also realized that there is no real end to this journey. You'll never get there as there is always something to improve. And so that is what you do. All the time another step forward. Getting better and better. Continuous improvement. You can see that the Road to Reliability™ must indeed be paved by Leadership.

Leadership and courage is required to move away from the status quo and take your first step. Leadership is required to determine the vision and stay the course along this winding and sometimes bumpy road. Leadership is required to overcome the resistance you will encounter along the way – and you will.

Leadership is required to embed all the changes along the way to make sure it all sticks and doesn't become the flavour of last month. And Leadership is required to know that you are never truly finished.

This is why Leadership is an essential element in our Road to Reliability™ roadmap. Not just Leadership in general, but specific leadership requirements to make this Journey to world class reliability.

## Want to find out more? Check out these online article:



### **Why are we so bad at maintenance management?**

No matter what industry or which country you look at, maintenance performance is pretty poor on average. That's obviously not a good thing.

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### **Your people are not your biggest asset**

There is classic saying in business literature that your people are your biggest asset. And just about everybody repeats this mantra everywhere you...

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### **The Road to Reliability is paved with culture and leadership**

A frequently used saying is that leadership is about doing the right things and management is about doing things right. But, to succeed on the...

[Coming soon](#)



# How to start

For most plants there is a simple and logical sequence to implementing the Road to Reliability™ framework.

## Planning & Scheduling comes first

You start with planning & scheduling to help stabilise your work environment, get on top of your real priorities and make space for some proactive work. Once you have planning & scheduling embedded you need to focus on Defect Elimination and root cause analysis. This starts to remove the repetitive failures that you are experiencing in your plant. And you'll slowly move from forever fixing to fixing your plant forever.

## Why Defect Elimination is so powerful

As you go through Defect Elimination you will identify other areas that you need to address. Imagine your plant is experiencing repeated bearing failures, as you get down to the root cause you could find that you have issues with your lubrication program, or you may have an issue with installation practices, there could be vibration

issues, your operators may run the equipment outside of the recommended operating ranges or you may be buying wrong or inferior parts. Defect Elimination and Root Cause Analysis will help you identify these issues so you can resolve them.

And this is exactly how I kept the Road to Reliability™ framework so simple. I'm not telling everyone to work on vibration monitoring and precision maintenance skills and operator care and spare parts etc. Instead with Defect Elimination and Root Cause Analysis it is your Plant that is telling you what you need to focus on. Simple, but highly effective.

## Make your PM program efficient & effective

With Defect Elimination under way you will need to focus on your Preventive Maintenance Program. And that's because pretty much every plant at this stage of the journey to reliability will have an inefficient and often ineffective PM program. And you can't afford that. Maintenance resources are scarce and you need to deploy them where it matters most.

# Final words

Sure, there is much more to reliability than just the 4 essential elements.

But my objective with the Road to Reliability™ framework is to help you focus on what truly matters and not get distracted by the many different tools, solutions, software packages etc. that are out there.

Focus on these 4 basics, get them working, get really good at them. Then and only then should you consider progressing into other areas. Sure there will be exceptions to this rule, but for the vast majority of us this simple approach to reliability will yield big results!

Want to continue the discussion?

No matter where you live or work you can reach me at: [www.roadtoreliability.com/contact](http://www.roadtoreliability.com/contact) or drop me an email at [erik@r2reliability.com](mailto:erik@r2reliability.com).



# The Road to Reliability™

starts with just a single step.

**Start today**

