



create the 40% of the work that is unplannable.

I would like to share my experience over my career with DuPont and in my years of consulting with many other companies and industries. In this work, we have identified five sources of defects. The percentages come from a study of 1,000 work orders at a particular site. The first source of defects was the raw materials they processed through their equipment that ate away at their equipment for 21% of the defects. Next how they operated their equipment caused 29% of the defects. The workmanship of the maintenance people caused 21% of the defects. The maintenance material used in the repair of equipment caused 8% of the defects. (That percentage might be a little low since it was the procurement people who collected this data.) And finally the design was the source of 21% of the defects. The point is that everyone in the organization adds some defects. Reducing the rate of defect generation is what we mean when we say defect elimination. So it is not just taking the defects out, it's eliminating the source that generated them in the first place. So everyone can help by developing a good habit of at least eliminating defects by not putting defects in

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## The 1% Solution

I was recently asked to give a RAP talk at the IMC conference in Florida. My first thought was how does someone my age give a talk to a hip-hop beat? It was explained to me that a RAP talk is much like a TED talk—a short (18 minutes or less) presentation about a well formed idea. As I began putting my thoughts together for this presentation, it occurred to me that presenting a complex idea in a short period of time required a concise and thorough understanding of the topic I was presenting. The title of my presentation was The 1% Solution. Below is a synopsis of that presentation:



A lot of engineers and technically trained people believe in the 80/20 Rule (Pareto) and believe that is how things work. For those of you not familiar with the 80/20 rule it says that 80% of your problems are caused by 20% of your equipment. The 80/20 Rule applies to the design of equipment or the technical aspect not to human interactions with the equipment. If you have good people interacting with the equipment you can do better than that. Pareto is a rule for cause and effect. People don't work that way. They work on purpose and goals. Today I am going to tell you why I think the 1% Solution is a better

*By Winston P. Ledet*

way for you to work.

A few years ago I gave the keynote address at the RCM conference about the ABC's of Failure. In that presentation I shared that only 16% of the failures came from aging and basic wear and tear—and this is plannable work. Aging defects can be handled with preventive maintenance and basic wear and tear can be handled by predictive maintenance.

The other 84% comes from random breakdowns. Some of this work is plannable because we have installed spares to cover for some of the equipment outages, and we use turnarounds to restore others. Therefore, only 60% of the normal work of maintenance is inherently plannable. The rest of the work is created by random acts of what we call careless work habits—not giving the equipment the care it needs to run properly. The sites where we see people break this pattern and achieve 92% to 96% planned maintenance for the long term, without regressing, are the ones where they eliminate the inherently unplannable work by eliminating the sources of defects in the careless work habits. This cannot be done by maintenance alone. Everyone who does work at a site contributes to the defects that create the unplannable work, and therefore everyone must participate in eliminating the defects that

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## SCHEDULE

Throughout the year,  
The Manufacturing Game®  
holds workshops for the general  
public at universities and/or  
professional organizations.  
For more information visit  
[www.mfg-game.com](http://www.mfg-game.com)

### Public Workshops

The Manufacturing Game® will be  
holding a Public Workshop at  
Reliability 2.0  
South Point Hotel, Casino & Spa  
Las Vegas, NV  
April 13, 2015

Learn how to identify and  
eliminate defects through  
cross-functional  
action teams

For more information or to register visit  
[www.MaintenanceConference.com](http://www.MaintenanceConference.com)  
or call (888) 575-1245

### Conferences of Interest

## RELIABILITY 2.0 — Las Vegas —

**Reliability 2.0**  
South Point Hotel, Casino & Spa  
Las Vegas, NV  
April 13–17, 2015

For more information or to register visit:  
<http://maintenanceconference.com>  
or call (888) 575-1245



**Reliability & Maintenance  
Conference**  
Austin, TX  
May 19–22, 2015

For more information or to register  
visit: [www.afpm.org](http://www.afpm.org)

**Mark Your  
Calendar!**



**The 1% Solution...cont. from page 1**  
the equipment in the first place and  
helping other functions to eliminate  
defects from other sources.

We all know that it takes  
repetition to form a new habit  
or learn a lesson...just ask any  
school teacher. The estimates  
range from something like 10 to  
30 repetitions needed to create  
a new habit and those have to  
happen in a reasonable amount  
of time. Creating a new habit is  
similar to Kurt Lewin's theory on  
organizational change. He says you  
have to unfreeze the organization,  
make the appropriate changes and  
then refreeze the organization with  
the new changes in place. The way  
this works for habits is:

You have to stop the bad  
habits—introduce the new behavior—  
and then refreeze when the new  
behavior has become a habit.

So let's look at what a defect  
elimination habit requires. From  
our benchmark studies in Japan, we  
concluded that the reason that they  
had reliability that was so much  
higher, than we did, was that their  
people worked in cross-functional  
teams to eliminate defects.

Confucius said, "I hear and I  
forget. I see and I remember. I DO  
AND I UNDERSTAND.

So people need the experience  
of working in cross-functional  
teams to eliminate defects—and  
this needs to become a habit.  
Gadgets like Fitbit and Jawbone  
have become popular as a way of  
helping us to create and enforce  
personal habits in our electronically  
controlled world. We do the same  
thing in our TMG workshops. In  
our simulation we collapse time  
and people get 20 authentic virtual  
repetitions of eliminating defects  
over the two days...and then we  
add a real world repetition at the  
end of the two days by launching  
cross functional action teams to  
eliminate defects back in the real  
work. The people on the cross  
functional defect elimination teams  
are composed of Operations,

Maintenance and Procurement and  
might have technical support as  
well.

This cross functional team is  
similar to what literature says about  
the 3 parts of our brain

—the intellectual part deals  
with the rational aspects

—the emotional part deals  
with the value aspects and

—the kinesthetic part deals  
with the physical actions of our  
bodies involved in the change.

All three have to agree for  
any new belief to take hold as a  
habit in our brain. If one part of  
our brain does not agree, we will  
not take the action. The same is  
true of cross functional action  
teams...each function brings  
a different perspective to the  
solution to eliminate the source  
of the defects. Our game provides  
a simulation of the intellectual  
aspects, the emotional aspects, and  
the kinesthetic aspects of defect  
generation so that our whole  
brain can buy into a new habit of  
eliminating defects before they get  
into our equipment, and it deals  
with all five sources of defects

In any plant that produces a  
product, there are not hundreds of  
defects at a site but tens or even  
hundreds of thousands of defects.  
You need everyone working for  
you to identify these defects and  
remove them at the source. You  
can do this with reliability teams or  
Six Sigma teams working on bigger  
and complex problems and cross  
functional DE teams working on  
the frequent everyday problems—  
seals, compressors, piping, valves,  
etc.

Once you get people involved  
in defect elimination it becomes  
addictive. Once the habit of defect  
elimination is formed it translates  
into self generating action teams in  
the real world.

So how does the 1% Solution  
fit in here? When we ran a scenario  
on the computer model with 1%  
of the work orders as DE work

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## Winston P. Ledet Receives Lifetime Achievement Award

At the 2014 International Maintenance Conference in Daytona Beach, Florida, Terry O’Hanlon and the team at Reliabilityweb.com surprised Winston P. Ledet with a Lifetime Achievement Award for his many contributions to the world of maintenance and reliability. Winston worked for DuPont for 27 years in research, technical,

works engineering, human resources/safety and maintenance. He has continued his work with companies striving to attain high reliability over the last 22 years with his own company Ledet Enterprises, Inc. featuring The Manufacturing Game. Winston is the author of two books—Don’t Just Fix It, Improve It! and Level 5 Leadership.



June Ledet, Terry O’Hanlon, Winston Ledet, and Michelle Ledet Henley

### The 1% Solution...cont. from page 2

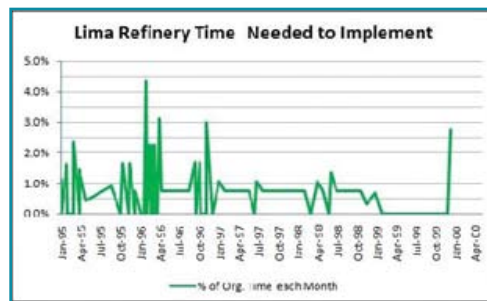
orders it demonstrated that in three years you would reduce work orders by 37.5% and in eight years by 70%. One of our clients got very excited about the 1% Solution and said –Heck...we’ll do 10% and get even better and faster results. We tried doing 10% of the work orders as defect elimination work orders in the computer model and found that it was too much and it killed the program. We believe the same thing happens in the real world...I am sure all of you have had the experience of being overwhelmed by the number of programs initiated at your site...some survived but many died away just because of lack of time, manpower or funding to keep them going...and unfortunately as we all know, it is not always the better programs that survive.

I went back and looked at data that I had from a refinery in Lima, Ohio that shows what they did over time—and it matches the computer model perfectly. They were doing 23,000 work orders per year steadily for the four years before we started the defect elimination workshops. They conducted monthly continuous improvement forums



to track and reward people for eliminating defects on action teams. They reduced the work orders by 37.5% in three years and went on to reduce the work orders to 7,000 per year which was a 70% reduction in 8 years.

They averaged 1% of their time on Defect Elimination work orders to get these results with some variation but never above 4%.



The graphic shows the number of action teams they created to achieve these great results. The number of action teams was almost equal to the number of employees at the



site and does not include the self generated action teams which they did on their own.

As engineers we always want to analyze the data to see what we should be working on but that can be tedious, time consuming and only good if the data is accurate

or available...but all of you have an untapped resource in the people who work for you. I heard something years ago that speaks to that...every pair of hands that you hire comes with a free brain...we need to recognize that there is tacit knowledge embedded in everyone who works at our sites. If we are not taking advantage of the knowledge and skills of our people by having cross functional defect elimination teams we are not making use of that “free brain.”

And now I issue you a challenge when you are back at your facility:

- start the new habit of doing 1% of your work orders on frequently failing equipment as cross functional defect elimination work orders,
- track the results and over time calculate the reduction you are achieving. I know it works...I have seen the results.

After a few months I’d like to hear from you with your results... My email address is [wpledet@mfg-game.com](mailto:wpledet@mfg-game.com). Good luck and remember to celebrate your success with your people and pass on your lessons to others in your company.

I plan on taking a step back from the day to day operations of The Manufacturing Game in 2015 and am leaving it in the very capable hands of my daughter and her husband, Michelle Ledet Henley and David Henley. I have enjoyed a long and rewarding career first at DuPont for many years and later with the firm I

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*“The abundance of opportunities to connect electronically with people through games and social media has also created a hunger — sated by tabletop games — for face-to-face contact. It turns out that being together is very addictive.”*



## TMG News

**The 1% solution..cont. from page 3**  
 started upon taking early retirement. During my almost 50 year career working with manufacturing and trying to get a grasp on reliability and best practices I have read many books, researched many lines of thought and networked with a lot of people who have insights in these areas. Sometimes my engineering background has led me to try to understand things from a logical and cause and effect approach...this has not always served me well since so much of what happens in our world is influenced by human behavior. At times the human behavior is so outstanding it can make a situation that could have been catastrophic an amazing success and other times it has made a not perfect situation result in a catastrophe. I urge you to realize the tremendous potential in the people working with you as you move forward on your journey toward reliability.

### Manufacturing Game Public Workshop at Reliability 2.0

Reliability 2.0 in Las Vegas, Nevada will be presenting The Manufacturing Game Public Workshop April 13, 2015. The Manufacturing Game® is a hands on learning experience that creates a reliability culture. Participants will experience how they can increase reliability through defect elimination and cross functional work, become more proactive and increase business performance.

See how The Manufacturing Game workshop can reinforce and improve your company’s reliability initiatives. It gives participants a chance to share their experiences with others. New and experienced employees get an overall view of the manufacturing, refining, mining industries, etc. The simulation and workshop allows participants

to see the whole system at one time and not just the function in which they work. Because the simulation collapses time, participants experience how the actions of one area impact the functions of another in the course of one day.

The Manufacturing Game® is designed for all levels of your organization from operators and maintenance personnel through parts procurement people, supervisors and upper management. Everyone learns the importance of reliability through defect elimination. For more information or to register contact [www.maintenanceconference.com](http://www.maintenanceconference.com) or call (888) 575-1245.

