

# 394

June 30  
2014

AMQ International's **STRATEGIC  
ASSET MANAGEMENT**



**COMMUNICATING THE LONGER TERM PICTURE**

Ten years ago, Leo Gohier - whose name will be familiar to longer term readers - presented the case for very serious increases in water rates to his councillors - and they agreed!

When I was at a workshop in Canada last month with Leo, he was asked to show us how he did it. How did he get notoriously short-time-framed councillors to make a decision in favour of the longer term? The answer was a combination of simple logic shown in pictures. It was a way of thinking about the future that he had developed some ten years previously. The same thinking and communication process can be applied to any asset.

Of course, over the last several decades, we have developed far more sophisticated asset management techniques, but it is one thing to have the latest technical knowledge - and a completely different thing to sell the results to others. They may be blown away by your ability, but unless they understand what lies behind the figures, they are unlikely to support your recommendations and, most importantly, to maintain that support when the going gets tough. So, in this issue, we look at *understanding the future* - with bubbles!

We also look at Accountability, Transparency and Evidence-based decision making. What do we understand by these terms?

Consider - apply - enjoy!  
Penny

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The future is not a matter of science fiction, you know a lot about it already. Communicating that knowledge is often just a matter of the way you put the picture together. Here, Leo Gohier, former Asset Manager, Hamilton City Council in Canada, and now Principal, IDX, explains

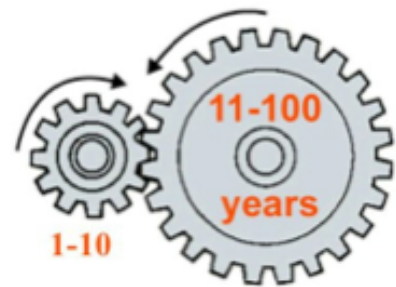
## THE BUBBLE CONCEPT



A five- or ten-year budget may seem like long-term planning, but it is not and it could lead you astray in terms of sustainable service delivery. Why?

Because you need to ensure that your ten year plan meshes with your longer term future.

For this you need a view of what the future could look like in terms of peaks and valleys, trends, as well as financial and service delivery challenges and expectations.



NOTE: The diagrams and the discussion refer to the year 2005. And they refer to water mains in Canada. It doesn't matter. *Once you understand the concept you will scale your own bubbles to suit the history of your own assets and the future that you are looking at.* Think now of your assets and when they were built.

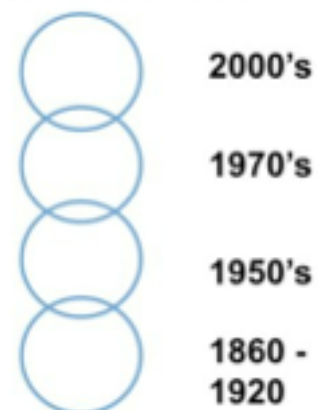
### Introducing the Bubble Concept

It was developed many years ago now, and yet it still resonates because it provides an ah-ah moment; the light comes on and people understand. Today, we do a much better job at projecting costs, etc. but we don't always understand why and what they mean.

We group assets in terms of age for the purpose of analysis and treatment and using groups can also help in communication.

Bubbles introduce the social element (i.e. why assets were built in the first place) as well as inter-generational fairness.

### INFRASTRUCTURE BUBBLES





My inspiration was actually the expression “this AM bubble is going to burst” and it could get messy if we don’t start thinking about it, talking about it and doing something about it.

Its simplicity is somewhat embarrassing in today’s world, and certainly *not a way to do AM*. But it is a way *to communicate and to understand* lifecycle and some of the social issues associated with AM. I recognise that it is very generic and high-level.

As an easy way to understand future trends in AM challenges, one can consider construction of assets by generation. Why? Because assets are for people, and every generation has been quite distinct from each other and received different services.

We can all relate to our own history: our youth, our adult life, the world our children lived in, what we fought for and expected from society for ourselves, our parents and our own children, and finally our senior years.

Centralized services only started to become widespread in the mid-nineteenth century, even in Europe. Societies at the time were very much rural, and cities as we know them today really came into being with the development of centralized services and were finally firmly established in the late 19<sup>th</sup>- early 20<sup>th</sup> century.

So the first bubble really covers that period from 1860 to 1920, i.e. our grandparents and their children (our parents) in their youth. The second bubble covers our parents as adults and us in our youth. The third bubble covers the baby-boomers as adults and our children in their youth. The fourth bubble covers our children as adults and their own children (our grandchildren)

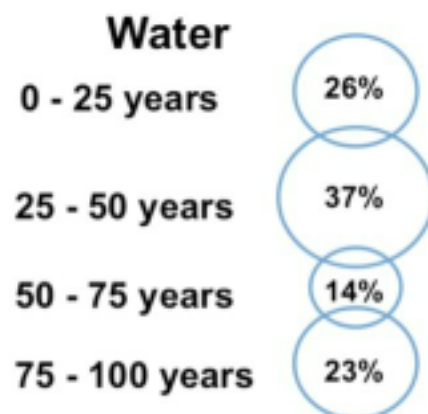
*NOTE: of course society is a continuous process, but this process does help to define types of infrastructure built as society evolved.*

A typical age distribution of watermains (by length) for a typical community is shown here.

*Please note that the “bubbles” are not the same size, i.e. there are nearly three times more watermains with a current age of 25-50 years than there are with an age of 50-100 years.* That is the result of a population explosion after the Second World War, the Baby Boomers.

**One could ask “So what?”**

**Answer:** Costs would be fairly consistent going into the future if all bubbles were at 25%, i.e. equal length and age distribution. That is not the case, so costs will vary greatly going forward when it comes to replace these pipes, since the quantities will vary so much from “one generation to another”





The next few diagrams start showing these peaks and valleys, in a relative way and not an absolute way (i.e. the numbers are not representative of actual costs, only relative costs – true costs will depend of course on the type of asset and the technology available and chosen to deal with those assets, but the principles remain the same)

With long-life infrastructure such as watermains or sewers, say 100-year life, it is reasonable to project that costs could be categorized as shown here:



In the first 25 years, minor maintenance only  
 In the next 25 years, major maintenance  
 In the next 25 years, rehabilitation  
 In the final 25 years, replacement

This is not unlike the human body, as an analogy – we have hip replacements, heart replacements, etc. and then we ourselves are replaced

*NOTE: all of these bubble concepts are not to be construed as being technically correct. They are presented for communication purposes only; they are meant to be understood by the general public and policy makers (i.e. elected officials) as logical and reasonable; the most important part of communication is to be understood, and bubbles do that very well*

As one can see from the above, around 2005 for the water mains being examined the following held:

- 26% of the assets require Minor Maintenance
- 37% required Major Maintenance
- 14% require Rehab
- 23% require Replacement

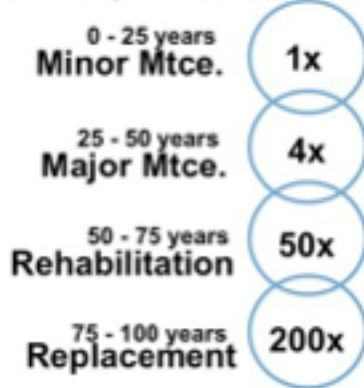
### With these numbers, where actually is the crisis?

The crisis is not today, but in fact tomorrow when the 37% bubble shifts into the rehab and replacement phase, which is much more costly as the next slides will illustrate.

**How much more costly? Let us put some rough dimensions in here.**



### Ratio of Expenditures



It is reasonable to expect that costs will increase exponentially for assets as they deteriorate.

Remember: with reasonable assumptions come reasonable projections (maybe not accurate, but reasonable – we all know the number is not zero, so any number is closer to the truth than simply saying “we don’t know” which is the verbal equivalent of the number zero)

For pipes, as well as most other long-life infrastructure, it is reasonable that costs will increase exponentially as follows (based on a review of actual maintenance and construction costs). For every dollar spent on Minor Maintenance, you will spend: \$2-4 on Major Maintenance; \$25-50 on Rehabilitation; \$100-200 on Replacement

Again, I stress that it’s the relativity that is presented here, and not actual costs – technocrats often miss that point, but this approach has been very successful in explaining why there is a “wall” coming (however big that wall may be) and that we are not in a crisis today compared to what is coming (and why it’s coming). It puts things in a relative frame.

2005	% of Infra	Factor	Sust.
0 - 25 years Minor Mtce.	26%	1	26
25 - 50 years Major Mtce.	37%	4	148
50 - 75 years Rehabilitation	14%	50	700
75 - 100 years Replacement	23%	200	4600

5474/Year

As one can see here, the numbers in 2005 represent total expenditures for the system as it exists. NOTE: these are not in thousands or millions of dollars, they are simply an absolute number

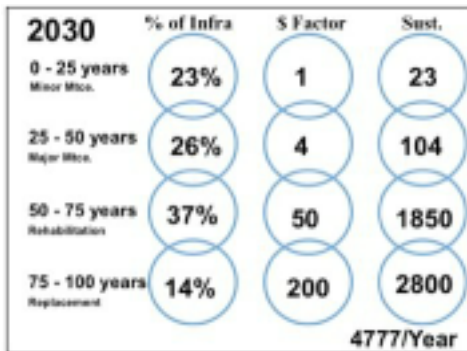
Using this as a base, one can now see what the future looks like, in a relative way. Since we are using the exact same approach to project the future, relativity is assured.

From 2005 to 2030, the bubble which showed that 23% of watermains needed to be replaced have now been all replaced. As such, they only require Minor Maintenance in the next 25 years

	2005	2030
0 - 25 years Minor Maintenance	26%	23%
25 - 50 years Major Maintenance	37%	26%
50 - 75 years Rehabilitation	14%	37%
75 - 100 years Replacement	23%	14%

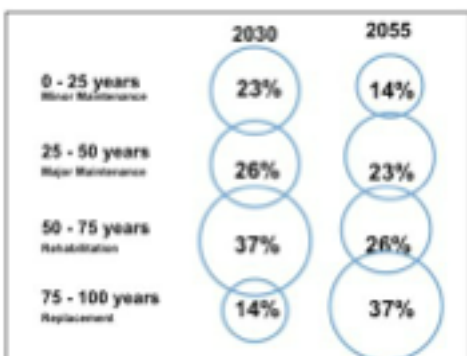
The 14% bubble has now moved down to the Replacement phase. This is a good time to be a Director of Public Works, since you could essentially claim that water rated could be reduced since assets that need to be replaced have been reduced by some 50% (from 23% to 14%). **Or could you? how can you claim that we have an infrastructure crisis today when replacement quantities are actually declining?**

The big bubble, the 37% bubble, has now moved from the Major Maintenance phase to the more costly Rehabilitation phase. All other bubbles also move down. This is a very dynamic and ongoing process. So what does this mean financially, in terms of overall investment requirements?



This diagram shows that by 2030, overall investment requirements actually decrease from the \$5474 that they were in 2025 to \$4777, or a 13% decrease – so this is in fact a good time to become a Director of Public Works or an elected official! – **Or is it?**

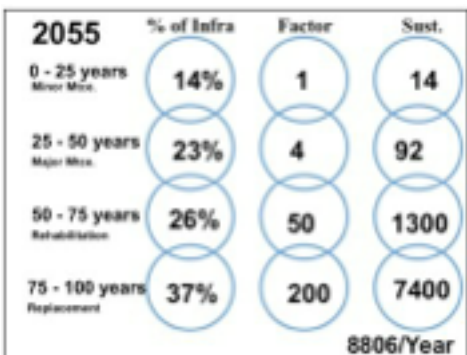
Again, these are relative numbers – they are NOT in millions of dollars, or anything like that



**By 2030, and for the next 25 years** (from 2030 to 2055), the small 14% bubble for Replacement will be replaced by the significant 37% bubble, an increase of nearly 300%.

This means that nearly 3x the number of watermain will need to be replaced when compared to the previous generation (25 years)

Mind you, all of the other bubbles also move down one, so what does that mean in terms of overall expenditures



Overall expenditures on the system increase from \$4477/year to \$8806/year – again, these are relative expenditures and not absolute expenditures

This represents a 200% increase in investment requirements from the previous 25 years – **this** is in fact the real crisis that we need to prepare for, and not the perceived one that we think we have today (at \$5474/year), which is only 60% of what we can expect in 2055

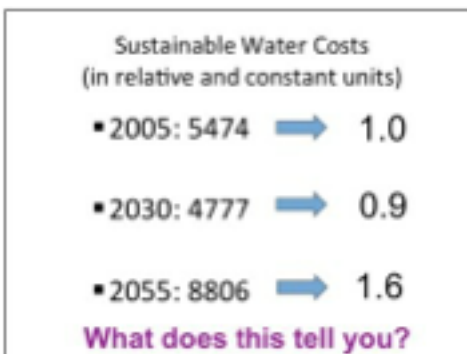
If today's water rates are expressed as the base number, i.e. 1.0, then

We can actually reduce rates from 2030 to 2055 by close to 15%

We then have to nearly double rates from 2030 to 2055

**With true lifecycle forecasting and planning, we see that it would be more advantageous for customers not to reduce rates and then have to increase them dramatically.**

**It is far better to increase rates gradually, and to put excess funds into reserves in order to meet tomorrow's financial requirements. The final rates will be that much lower than if we follow the generational yo-yo.**



The real problem is **NOT** the accumulated deficit or the 75 to 100-year old infrastructure.

It's the 25 to 50-year old infrastructure bubble, that will burst in the next 25-50 years  
+  
how we value water.

### Lesson learned:

Projections on a lifecycle basis are the only way to properly project costs in such a way that the general public and elected officials truly understand what is happening to their assets and what relative costs are to be expected.

Then, and only then, can the proper policies be developed with respect to: Infrastructure re-investment policies

- Level of service adjustments in order to align expenditures with revenues, as well as minimize and mitigate financial burdens today and in the future
- Inter-generational fairness
- Future impact of growth-related additional assets that come along annually as the community grows – studies have consistently shown that new development does not pay for itself, and that it becomes “the gift that keeps on taking”

### The Three Realities

REALITY #1:

*HARLAN CLEVELAND WAS RIGHT!*

We know in our hearts that we are in the world for keeps; yet we are still tracking 20-year problems with 5-year plans, staffed by 2-year personnel working with 1-year appropriations. It's simply not good enough.

REALITY #2:

If We Don't Change Direction Soon,  
We Will End Up Where We Are Going.

Professor Irwin Corey

REALITY #3:



"No code, no formula, no decimal points, no factor of safety, what do I do?????"

There is a lot you can do

Use your imagination, your common sense

Make courageous projections, and have courageous conversations



## THOUGHTS ON ACCOUNTABILITY, TRANSPARENCY AND EVIDENCE-BASED DECISION MAKING

When we look at the three guiding principles of good asset management - accountability, transparency, and evidence-based decision making - how do you interpret these principles”

### 1. Accountability

Are you accountable **TO**, or accountable **FOR**.



Accountability is not consequences, but ownership. It is a character trait, a life stance, a willingness to own your actions and results regardless of the circumstances. In the book *Freedom and Accountability at Work: Applying Philosophic Insight to the Real World*, the authors Peter Koestenbaum and Peter Block discuss accountability as follows:

‘We have a small way of thinking about accountability. We think that people want to escape from being accountable. We believe that accountability is something that must be imposed. We have to hold people accountable, and we devise reward and punishment schemes to do this. These beliefs are so dominant in our culture that they are difficult to

question, yet they are the very beliefs that keep us from experiencing what we long for.’

It is this belief which leads us to want to have asset management imposed on our organisations. It is belief which often makes us want to have accountability imposed on ourselves!

The very nature of accountability rests in the understanding that each and every one of us has freedom of choice. It is this freedom of choice that is the foundation of accountability.

Michael Lenington, in the *12 Week Year*, says

‘Accountability is the realization that you always have choice; that, in fact, there are no have-to’s in life. Have-to’s are those things we hate to do but do anyway because we have to. The fact is that there are no have-to’s. Everything we do in life is a choice. Even in an environment where there are requirements of you, you still have choice, but there is a big difference when you approach something as a choose-to versus a have-to. When something is a have-to it’s a burden, it’s cumbersome, and, at best, you meet the minimum standards; however, the realization that you ultimately have choice creates a very different scenario. When you choose to do something you are able to tap your resources and give your best. It is a much more empowering stance. Ultimately, you choose your actions, your results, your consequences.’

**THOUGHT:** If we want Asset Management to flourish, it must be because we - as asset managers - accept responsibility, that we hold ourselves accountable. Are we? Each and every one of us?

## 2. Transparency.

Many fear transparency. But I was listening to a program on the future of the MOOC (Massive Open On Line Course) on the ABC's "Future Tense" and I was struck by a comment by Anant Agarwal, the CEO of MOOCs provider, EdX (the Harvard instituted MOOC that was responsible for the excellent Delft Course on Next Generation Infrastructures).

EdX had been criticised for the way in which its peer grading system had been operating. The CEO accepted that the criticism was valid but pointed out that the system was barely a few years old. "Yes, others have found flaws in our grading system. But edX is open source, we are non-profit, we've also made our platform available to anybody. So anybody can take our software and evaluate it, and various people have done that and they've shown that our software, which we made available to everybody, has flaws, **and we say, great, let's improve upon it.** And so we really believe that being open about our software and how we do things will enable people to cast sunshine into what we do, and as we all like to say, sunshine is the best disinfectant, and so we find out what's wrong and what can be done better, then we go do it."

### What a great attitude!

**QUESTION:** Could Asset Management make as much gains as the MOOC movement in just a few years if we adopted the same approach? How could your organisation be more open and transparent - about its data, its practices, its policies and its intent?

## 3. Evidence based decision making.

There are many levels at which evidence should be sought if we are to have true evidence-based decision making. First of all we need evidence that the problem we want to tackle really exists, that it needs attention, and that we are the right people to deal with it. Provided we are still in business after we have done this, then we need evidence to support the conclusions we have reached concerning each of the possible options that we could choose to deal with the problem. When considering the options we need to take into account the implementation methods we would be using. So this is a far more involved process than many give it credit for.

I was once asked to run a strategic asset management workshop for a group looking at road safety. They were as one with their objective - safer roads. However when I asked about the performance of roads over the last 5 years and whether they were becoming safer, less safe, or pretty much staying the same, about a third of the group voted for each option! I had deliberately not specified any particular road and I suspect that each had a different section of roads in mind, but this is part of the problem. Where we would look for evidence in this case? And would each group look for the evidence (and the road system) that supported their supposition. This problem is endemic, of course, when we are addressing broad policy issues. At the operational level, the road system is usually narrowly specified.

**QUESTIONS:** What qualifies as 'evidence' at each level in your organisation? Is it good enough? When using data, what quality of data is acceptable?

### YOUR THOUGHTS?

(and if you are not thinking of these things, can you really call yourself an Asset Manager?)

## GOOD NEWS



**Part 2 of the Delft Next Generation Infrastructures Course will be held by EdX in September.** It will deal with Infrastructure that is **Smart, secure and sustainable. The potential role and impact of smart grids, eco-cities, flexible infrastructures and ICT** Go now to <https://courses.edx.org/> sign up (it's free), put your name down for this course and you will be notified when it starts. (You can always withdraw at the last moment if the timing is impossible for you but it is worth trying.)

**The really good news** is that they are also keeping the videos, transcripts, slides and reference data up on line for auditing purposes. (That is, you cannot claim a certificate but you can access everything) So if you want to know about complex systems, actor analysis, system of systems, evolution of infrastructures, convergence, government challenges, network theory, system dynamics, gaming simulation with respect to infrastructures. safeguarding public values, regulation, robustness and resilience of infrastructure networks, and governance, then have a look at this course - you can select just the bits you are interested in.

## BAD NEWS AND AN APOLOGY

### A life cycle for Services

**My sincere apologies to the person who sent a me a diagram and a suggestion for how we might design a service life cycle. I was delighted to receive it. Unfortunately I put it aside until I could give it my full attention - and now I have lost it!**

**Could you please re-send?**