

# The Good, The Bad, and The Noisy

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Not Refereed

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## Abstract

Modern technology allows us to do things quickly, often with significantly less physical effort than would otherwise be required. Our lives are now filled with everything from power tools to kitchen appliances. Construction sites are littered with machinery designed to make life easier.

This paper examines the acoustic downside of technology—the noise that it produces. A serious view of available low-noise options which are not yet commonly used, along with a light-hearted look at the way it could be if we put our back into it.

## Introduction

I recently heard an opinion that new low-emission diesel engines could be noisier than the previous generation.

Surprising as this might seem, the argument seemed plausible. Lower emissions requires a more efficient

engine, and a more efficient engine needs higher compression to achieve better combustion of fuel. Higher compression means “a bigger bang” which of course suggests more noise.

Thankfully, the latest buses to hit the streets in Christchurch seem to be quieter rather than noisier. The

fallacy in the opinion, of course, is that if the engine is more efficient, then it is possible to use a smaller engine to produce the same amount of power.

Unfortunately, quieter engines are only coming about as a result of legislation forcing manufacturers to comply with ever-more-stringent

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- Manual Grinder<sup>1</sup> 67 dBA
- Mechanised Grinder<sup>2</sup> 81 dBA



Figure 1: Give us this Day

noise rules. Nobody seems to take noise control seriously just because the public are sick and tired of too much noise.

Even more unfortunate, is the trend towards faster, simpler, ways of doing everyday tasks.

Whilst we are all guilty of owning a number of such “machines” ourselves, they are inevitably considerably noisier than the slower, labour-intensive, methods which they replaced.

## Give us this Day

The days of “...our daily bread...” are gone. Nowadays, it is “...our daily caffeine dose...”, or so it seems based on the astonishing rate at which the

consumption of coffee is increasing in New Zealand.

Until the 90’s, espresso coffee was almost unheard of, yet by 2002, each person in New Zealand was drinking 380 cups of coffee (Source: World of Coffee 2002), and each of those cups required beans to be ground.

The “quiet” way to do the grinding would be to do it in a large factory somewhere in an industrial area where the effects of any noise are “less than minor”.

Unfortunately, as any coffee aficionado will tell you, coffee starts to deteriorate as soon as you grind it, so the only way to make a great cup is to grind the beans as you need them in the coffee shop.

This, of course, is just another noise source in our already noisy café’s. Nobody any longer uses manual grinders.

We now prefer a mechanised one, along with a regular gym membership to strengthen the arm muscles which would have been adequately worked out if we had stuck to the manual method.

Acoustically, the news is even worse, as the quick comparison shown in figure 1 demonstrates.

## After the Event

Having dosed up on coffee, it is not long before the human body demands to get rid of what it doesn’t want, resulting in the

### Standard:

- Ardrich, model A255P<sup>3</sup> 80 dBA
- Stiebel Eltron, model HTZ20 80 dBA
- JD Macdonald, Autobeam 79 dBA

### Quiet:

- Vortice, model ANDR 67 dBA
- JD Macdonald, Mirage D5 64 dBA
- Stiebel Eltron, model HTE4 64 dBA

### The Alternative:

- Paper towels (being used) 64 dBA

Figure 2: After the Event



*Even the latest designs in hand-driers fail to list noise level as one of their “features”.*

<sup>1</sup> Spong Hand Coffee Grinder, measured as an  $L_{eq}$  over the period of operation, at a typical operator position.

<sup>2</sup> Mazzerluigi M100 commercial grinder, measured as an  $L_{eq}$  over the period of operation, at a typical operator position.

<sup>3</sup> Hand-dryer measurements are typical  $L_{eq}$  values at “users ear” position.



- Bus, driveby at 30km/hr<sup>4</sup> (3m) 85 dBA
- Car, driveby at 50km/hr (3m) 76 dBA
- Late model car, inside at 50km/hr<sup>5</sup> 67 dBA  
(with Meat Loaf playing loudly 82 dBA)
- Late model bus, inside at 50km/hr 80 dBA

Whatever happened to the quiet alternatives?

- Walker, at 3m on paving - hard soles 60 dBA
- Walker, at 3m on paving - soft soles 50 dBA

Figure 3: Time to Go



inevitable visit to the little room out the back.

Unfortunately, one of the most common methods provided for patrons to dry their hands is an electric hand-drier.

If ever there was a machine aimed at discouraging people from drying their hands, this surely has to be it. The noise level produced by some of the standard models is unbelievable, as figure 2 demonstrates.

Fortunately, there are now a few "quiet" models on the market, as figure 2 shows.

Unfortunately, most of the quiet models achieve lower noise levels by locating their fan in the ceiling void, with a duct inside the wall.

Not a bad solution, except that the

price goes up further than the fan, and fitting such a model into an existing building is somewhat challenging. On this score alone, none of these even remotely stack up to the cheaper alternative of a good old fashioned paper towel.

## Time to Go

Two noisy sources over coffee, and now it is time to say goodbye to our friends and go home.

No problem, my sparkling second car, recently off the wharf as a used vehicle from Japan will get me there in no time (unless your city has a congestion problem). Or, because I chose to have a couple of beers after work today, maybe I'll catch the bus instead.

More noise, this time affecting both the passengers and the innocent bystanders, as figure 3 shows.

Unfortunately, the noisier alternatives also have an impact on the passionate few who choose to run, walk, or cycle. The pleasure of a quiet walk is now often diminished by the noise of traffic ferrying those who lack the energy to utilise the quiet methods.

## Autumn Colours

Ahh, what a wonderful season Autumn is, with leaves changing from green to all manner of reds, yellows, oranges, and browns, before floating gracefully to the ground.

But, hark, what is that noise I hear as I admire the spectacle?

<sup>4</sup> Pass-by noise measurements are typical maxima ( $L_{max}$ ). Interior levels are typical  $L_{eq}$ .

<sup>5</sup> Measured on straight level road with medium chip seal.

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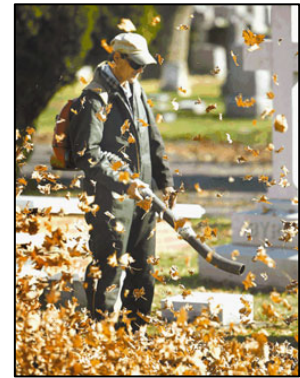


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- Leaf-blower<sup>6</sup> 90 dBA
- Leaf Rake<sup>6</sup> 56 dBA
- Stiff Broom on Concrete<sup>6</sup> 64 dBA

Figure 4: Autumn Colours



The noise from a leaf-blower is a truly astounding example of how noise affects the brain. Not only are maintenance workers seemingly unable to lift a rake or broom any more, it seems that they haven't even realised that the leaves they are blowing onto the road today are the same ones they blew onto the road yesterday, and probably the day before that too.

Pointless noise in any language.

Besides which, it is fine for the operator to wear his sparkling new Grade 5 hearing protectors (sometimes at least), but what of the poor pedestrians who have to endure high levels of noise while trying to mind their own business and enjoy the colourful scenery of the season?

## Cocktails anybody?

Having survived another noisy trip home, a smooth drink is the order of the day. Out comes the trusty blender to puree the banana, and blend in the nonfat yogurt, sugar, liqueur, crushed ice, and lime juice.

Absolutely superb, as long as you can cope with the noise during the making, and the calories during the drinking.

A mouli would solve the first problem: some would argue that the second is not a problem at all.

It seems that Moulis only get used for preparing baby food these days, and as a result, even measuring one has proved too great a challenge for this paper.

However, anything would surely be an improvement on the old noisy blender in our local café!

## DIY Weekends

Roll on the weekends. Time to retire to the male domain of the workshop for a bit of DIY therapy.

Relive the receiving of power tools as Christmas and birthday presents.

Perhaps even make or repair something—although that is surely a non-essential side effect of a great day quietly relaxing in the shed.

Oops, did I say quietly?

What ever happened to a good old handsaw and piece of sandpaper? Now the trusty circular saw and beltsander have appeared, along with the resulting noise which they produce. Figure 6 gives examples, all measured under normal continuous usage, typically over periods of 30 – 45 seconds.

## The Effects of Noise

Noise is clearly rather insidious. Most studies concentrate on possible hearing damage resulting from noise exposure.

But what of the glaringly obvious side-effects to our system?

By the time we have been exposed to the noise of coffee grinders, hand-driers, vehicles, leaf-blowers, and home appliances, our bodies are so out of shape, that we can no longer use the quiet alternatives.

Noise clearly causes our muscles to atrophy so badly, that having been exposed to these various noise sources over a period of time, we no longer have the strength to hand grind coffee, or the stamina to ride a



- Blender<sup>7</sup> 106 dBA
- Mouli ???

Figure 5: Cocktails Anybody?



<sup>6</sup> Approximate  $L_{eq}$  at operator ear position.

<sup>7</sup> Commercial Bar Blender, high speed,  $L_{eq}$  at operator position. Blender is in poor condition, in need of replacement!



bicycle home.

A teenager was screwing some pieces of wood together in my workshop recently, and the cordless drill battery failed.

He was totally at a loss to know what to do. When I handed him a

screwdriver, he looked at me as if to ask “do you expect me to use this?”.

Clearly, even the relatively quiet cordless drill had addled his brain and jellified his muscles to the point where he was unable to contemplate the quiet alternative.

## Useful Examples?

Surely there are numerous examples of technology which produces less noise than its predecessor?

Surely responsible manufacturers are so concerned about their customers



- Circular Saw<sup>10</sup> 101 dBA
- Belt Sander<sup>11</sup> 92 dBA

- Hand Saw<sup>8</sup> 82 dBA
- Hand Sanding<sup>9</sup> 54 dBA



Figure 6: DIY Weekends

<sup>8</sup> 5 teeth per inch rip saw measured at 500mm horizontally inside double garage.

<sup>9</sup> 80g sandpaper with cork backing block, measured at 500mm horizontally inside double garage.

<sup>10</sup> Hitachi 185mm saw with 30T tungsten carbide blade, ripping, measured at 500mm horizontally inside double garage.

<sup>11</sup> Makita 9401 heavy duty 100mm belt sander, measured at 500mm horizontally inside double garage.

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Two products from the range offered by Attachments International Ltd: the bucket mount (Left), and the boom mount (right).



Figure 7: Asphalt Cutter

that they spend millions of dollars in research and development to produce quiet methods for achieving fast results?

I've struggled to find "numerous" examples. It seems that the Tim Taylor adage of "more power" to get the job done faster, inevitably means more noise. However, I've managed to find two excellent examples available.

#### Asphalt "Pizza Slicer" Cutter

Why do we still have to put up with screaming diamond-saws cutting slots in the road, when the quiet pizza slicer concept has been successfully adapted for cutting asphalt.

Attachments International Ltd (USA), for example, now offer several models, all designed to attach onto other machinery. The bucket mounting model, and the boom mounting model, (figure 7) are two of their range.

I've never seen one of these in use, but they are clearly becoming widespread in other countries. The bucket mounted version pictured

above was recently available on e-bay for US \$800.

#### Steel Cut-Off Saw

Several years ago, I was engaged by a client who produced wrought-iron and forged steel products. They wanted help with a resource consent issue.

One of my immediate concerns was how they would ever be able to comply with the District Plan noise rules when they used a cut-off saw.

On asking about this issue, the client replied that this wouldn't be an issue because they had bought a new "quiet" type of saw.

Almost all my clients make claims like this, so I was certainly not jumping with joy at the thought that one of the major noise sources had disappeared.

Thankfully, when I visited the client's site and measured the machine, it was indeed a very pleasant surprise.

The machine is a Bramley S250. Instead of using a friction blade

running at high speed as most modern cut-off saws do, the Bramley model uses a low speed steel blade with very fine teeth much like a hacksaw.

Fluid cooling ensures that the blade doesn't overheat, and also eliminates sparks which are an integral part of the alternative method.

Figure 8 shows comparative noise levels for the two methods.

#### Conclusions

The modern-day curse of mechanisation means greater speed and ease of use also means more noise for the average Joe public.

Excess noise has also taken its toll on the health and fitness of society, with gymnasiums and weight-loss clinics cashing in on the masses who can no longer wield hand tools.

Despite modern advances, there are few commercially available examples of technology for undertaking modern tasks quietly. □

- Friction Blade (high speed) 110 dBA
- Bramley S250 low speed model 81 dBA

Figure 8: Steel Cut-Off Saw

