



10 steps to Noise at Work Risk Assessments



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GUIDE

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Carrying out a noise at work risk assessment can be a daunting task – especially if you're new to all this. It can seem that the more you read, the more confused it can all become. It is for that reason, I have decided to put together this simple guide covering 10 of the things you will need to do to get this assessment nailed!

1. How to decide where to start.
2. Whether you need to measure anything.
3. What measurements you actually need – there's only 3!
4. What instruments you're going to need.
5. Where to take your measurements.
6. Comparing the numbers with the law!
7. What to put into a risk assessment.
8. How to make recommendations.
9. What is the executive summary?
10. Where to go from here...

This whole thing is really about trying to prevent people who work for you going deaf! And it's often worth coming back to that as it can make everything seem a little simpler. What you really need to do is implement what is known in the trade as a 'hearing conservation programme', but more of that later – the first step is to get a decent risk assessment so you can decide what to do next.

We cover all of this in some detail on our Need2Know Seminars. Just follow this link to find out more and book a place.

<http://www.need2know4free.com/>

For more in depth knowledge, the Castle Training Academy has a dedicated noise at work competence course, specially designed for people with a responsibility for health and safety.

<http://www.safetytrainingacademy.co.uk/events/291111-noise-at-work/>

1. How do you decide where to start?

A lot of this information is going to be quite similar to the HSE guidance book (L108, Controlling Noise at Work) because, well why wouldn't it! That book is really well written and has all the information in it you could need. It is comprehensive and that is why I'm trying to make this a little more abbreviated.

The HSE guidance quite simply says you should start by making observations. This is also how you can then decide to take the next steps and what will be needed. What you're looking for here is some of the following

- Where are the potentially noisy areas in the workplace?
- Who is working in them or visiting, and for how long?
- Do you have to shout in those areas to be heard?
- Is there any potentially noisy mobile plant being used by employees?

- Who is using it and where?
- Is any hearing protection in use, by whom and what is it?

Quite simply, you should start with the people who you think work the longest in the noisiest places and then work down from there.

If you write down all your findings, this will make a really good start to the risk assessment document.

2. Do you need to measure anything?

You actually might not need to measure anything at all! And that might sound strange coming from someone who, amongst other things, makes a living out of selling sound measuring equipment! The truth is, if you can be confident that there is no discernable noise in your workplace, then so long as you say so in your risk assessment, you are covered.

Unfortunately, it's not quite that straight forward. Firstly, you might well feel confident that the noise isn't a problem, but are you sure there isn't something you missed? Workplace noise can vary considerably at different times of day or week or during different processes. Secondly, there is the ever-present threat of claims, and the simple fact here is that if you haven't taken measurements of the workplace and at least tried to figure out who is exposed to what, then you won't stand a chance of successfully defending or mitigating that claim.

3. What measurements do you actually need – there are only 3!

Modern sound meters can be phenomenal things that can calculate everything you ever need and much more besides. Sometimes, the problem can actually be figuring out what you don't need as much as what you do! I think it is a good idea to break the job down in to 3 parts to help decide on what type of measurements you might need.

- Risk Assessment
- Hearing Protection Suitability
- Noise Control

Risk Assessment

The risk assessment part of the noise regulations actually only requires you to take 2 measurement types. The first is the Leq ('A' weighted) and the second is the Peak ('C' weighted). That's it! Most half decent sound meters (not the type you get from your local electrical store!) should do this for you no problems although it is worth noting even some expensive meters do the two things separately, so it's wise to make sure you've got one that can measure both parameters at the same time.

- Leq(A) – Level equivalent measure with the 'A' frequency weighting
- Cpeak – peak sound pressure measured with 'C' weighting

Just as a reminder, the Leq is simply the equivalent sound level over time, which means you can have a single sound level number to represent the sound that happened. Just think of it as the sound level from the start of the measurement to the end. To create this number, the sound meter has to 'crunch' a lot of numbers to calculate this figure. The 'A' weighting part is a way of changing the frequencies sound the meter 'hears' to make it much more like the sound a human would hear.

The Peak is a completely different measure and requires some separate circuitry or digital code to work it out. Sound is created when a vibrating surface causes the air pressure in the immediate surroundings to fluctuate. These fluctuations are dispersed through the air when the air molecules knock into each other such that the sound 'waves' travel outwards. The peak sound pressure is simply the biggest of these fluctuations. The peak is measured using 'C' weighting which includes a lot of the frequencies of sounds humans can't hear but are thought to be potentially dangerous at high enough instantaneous levels.

Hearing Protection check

The other task you are likely to want to undertake as part of a noise at work survey is to look at hearing protection, whether to assess existing hearing protection already in use, or to establish what kinds of hearing protection might be suitable for a given job. There are 3 ways to do this and the measurements you take will be determined by what you decide to do.

- SNR – Single Number Rating method
- HML – High, Medium and Low (Frequency) method
- Octave Band – Using Octave Band attenuation data

The Single Number Rating method is an appealing one to use as it looks simple on the face of it. You should, however be very wary of this approach as it does not take any account of the frequency of sound an employee is exposed to and this can make a huge difference to your results. Hearing protection works much better at high frequency than low and this is why some of this variation should be accounted for. To use the SNR method, the Rating number for the protector is subtracted from the 'C' weighted Leq, so you have to measure that separately anyway! You then add 4dB if you want to follow the HSE guidance as this is designed to adjust the result for problems of fitting, wear and tear and the varying shapes of human ears

- 'C' weighted Sound Pressure or Leq required
- 4dB 'real world' correction at the end

The HML method is a great way of taking into account the performance variation over different frequencies and requires the 'C' weighted Leq as well as the 'A' weighted Leq and uses the difference between this and the 'C' weighted level (a bigger difference means more low frequency sound!). There is a formula for working out the protection level in the booklet from the HSE "Controlling Noise at Work L108" which can be downloaded from the HSE website. There is also a calculator on that site at this link <http://www.hse.gov.uk/noise/calculator.htm> which will do the job for you!

It is a really good idea if using either of these methods to have a sound meter that can measure the 'A' weighted and the 'C' weighted Leq sound levels at the same time. You will also find that the decent ones will have software available to do the HML calculations for you! The Castle SONUS meters are perfect for this –

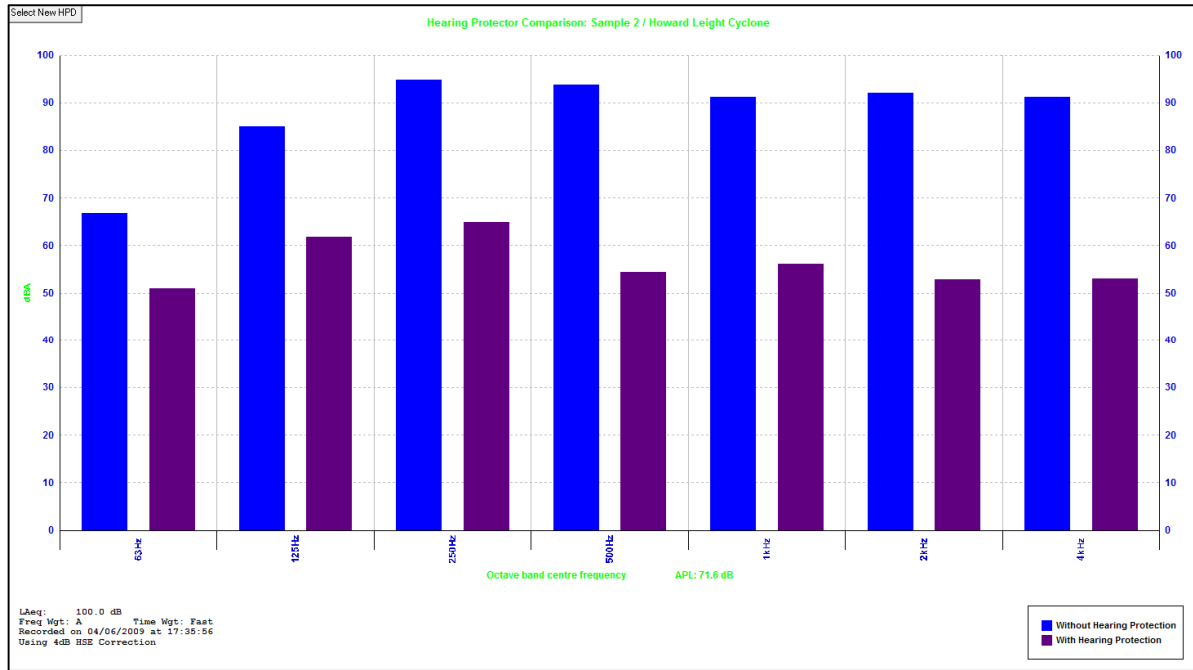
<http://www.castlesafetyshop.com/noise-meters/industrial-noise-meter-kits/nk001-logging-sound-meter-system.html>.

- 'A' weighted Sound Pressure or Leq
- 'C' weighted Sound Pressure or Leq
- Use formula, HSE calculator or sound meter software
- 4dB 'real world' correction

Using the Octave Band Method requires use of a sound meter that can measure in octave bands. Using this method is certainly the most accurate method of calculating the effect of using a particular ear defender in a given environment. You will need to measure the 'A' Weighted Leq in octave bands, which will give you 8 or more levels at different frequencies. Your chosen hearing protection will have a table of data with it, stating how much it will reduce the sound level at each frequency. From here, it's simply plugging that into the HSE calculator <http://www.hse.gov.uk/noise/calculator.htm>, or using your sound meter software to come up with the answer. The Castle GA141 series meters do everything you need for octave band hearing protection. The picture below shows how this looks in dBdata PC software for the sound meters.

<http://www.castlesafetyshop.com/noise-meters/industrial-noise-meter-kits/safety-advisor-sound-meter-kit.html>.

- 'A' weighted Leq or Sound Pressure in Octave Bands
- HSE Calculator or Sound meter Software
- 4dB 'real world' correction



What you will get at the end of the process with each of these is a single number representing the residual sound level at the ear after the hearing protection. This number should certainly be lower than the Limit value in the regulations of 87dB and should ideally be between 70 and 75dB.

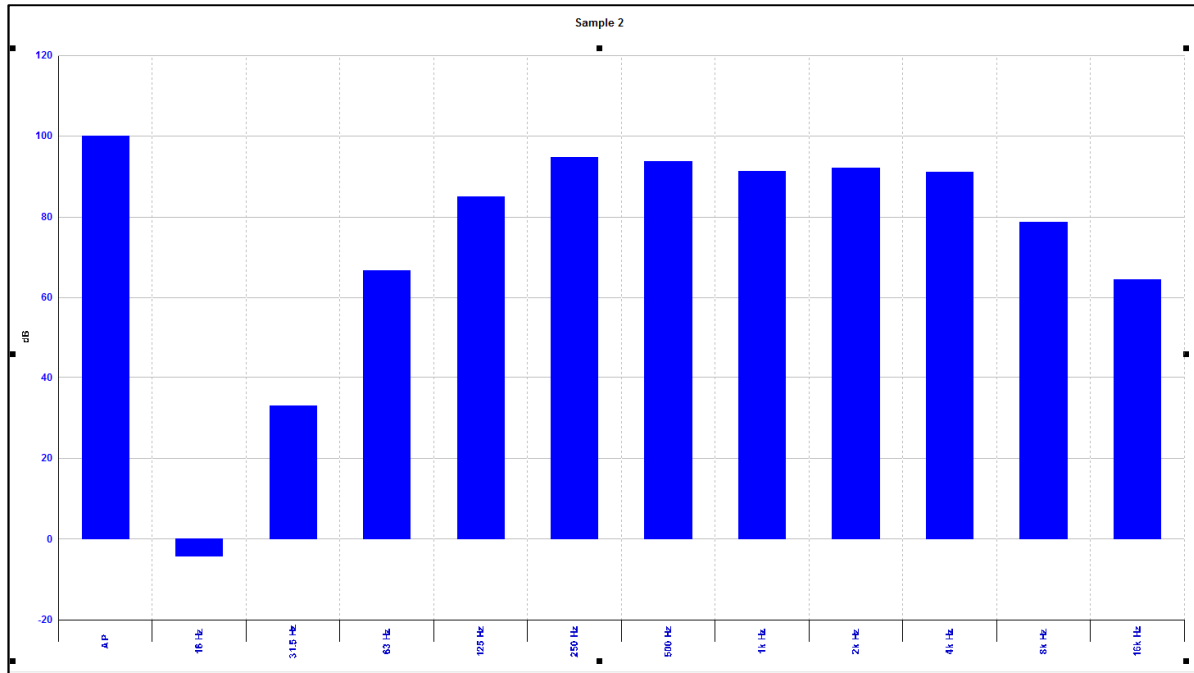
Noise Control

If you find the results of the risk assessment show problems in the workplace that need resolving, then you may well have to carry out some noise control measures. This could be something as simple as effecting repairs to your pneumatic lines, exhausts and nozzles or it may be more complex involving engineering solutions to reduce the noise from plant and machinery at source. Some examples of where noise control may be needed.

- Air noise from pneumatic tools
- Noise from production machinery with faulty bearings or moving parts
- Maintenance work
- Noise from hand held equipment
- Industrial processes
- Construction noise
- Testing facilities

If you need engineering measures to control the sound output of a machine, you are probably best advised to bring in a specialist noise control expert as this is a complex field fraught with potential for spending a lot of money to achieve very little. Castle consultants can certainly help with this and you can find out more by having a chat with us on +44 (0)1723 584250.

If you're doing some of your own noise control work, you might well need to measure the noise in a different way by looking at the Octave Band levels. This gives an insight as to the frequency content of the noise you are measuring – in other words, how much low, medium and high frequency there is in the overall noise environment. The picture below shows how octave band data might be displayed



The reason Octave Band data is used is because it gives a very good indication of the effect of any noise control at specific frequency points. You might see, for example that the work you have done only reduces the noise at high frequencies, when a lot of the problem is at low frequencies.

4. What instruments are you going to need?

There are various types of noise meters that can be used for noise at work assessments and they all fulfil slightly different roles, depending on what you are trying to achieve.

- Sound Level Indicator
- Hand-held Sound Level Meter
- Personal Sound Exposure Meter (Dose-meter or Dosimeter)
- Octave Band Sound Meter

Sound Level Indicators

This type of equipment is usually found in catalogues and will come with an attractive price-tag. Be warned, however, that these instruments should only ever be used if you want to check that there are no levels anywhere near the action values stated in the regulations (more on that later). You can have a look at one such meter on the Castle shop, which we sell for occasions where there is just that basic need. These meters do not, however stand up to scrutiny and can report significant errors as soon as there is a complex mix of frequencies often found in industry.

<http://www.castlesafetyshop.com/noise-meters/sound-meters/sound-level-indicator.html>

Hand-held Sound Level Meter

To be called a Sound Level Meter, equipment must comply with IEC61672, an international standard that governs the design and manufacture of this type of instrument. As we have discussed before, there are certain criteria that must be met to fulfil a noise at work assessment.

- Compliance with IEC61672 class 2 as a minimum
- 'A' weighted Leq – Laeq
- 'C' weighted Peak hold
- 'C' weighted Leq – Lceq – if you want to look at hearing protection selection

The thing to look out for here is that you ideally want all of these measurements to be made at the same time, otherwise you are going to have to go back and repeat each measurement exercise. For an example of a meter that will do this, have a look at the Castle SONUS meters.

<http://www.castlesafetyshop.com/noise-meters/industrial-noise-meter-kits/nk001-logging-sound-meter-system.html>

Personal Sound Exposure Meters (Dose meters, Dosimeters)

Dose meters are incredibly useful for assessing the exposure of mobile employees. There are a number of reasons for mobile employees that can be as follows

- Fork lift drivers
- Maintenance technicians
- Lorry drivers
- Grounds maintenance
- Job-rotation
- Construction workers
- Roving engineers

For these people, it can often be the only way to capture the extent of their exposure to noise in the workplace. Dose meters are worn by the employee with the microphone attached to the collar. You can see this in the picture here. An example of a Dose meter can be seen on the Castle shop by following this link.



<http://www.castlesafetyshop.com/noise-meters/dose-meters-personal-noise-meters/ga257-pocket-dosemeter.html>

Octave Band Sound Meters

As discussed above, Octave band meters have two main applications within the control of noise at work regulations, although this type of meter should also fulfil the role of hand-held sound meter too.

- Hearing protection selection
- Noise control effectiveness

There are various models of octave meters available, all of which will give the information needed for this application. The important thing here, again, is that the meter will give all the information required in one measurement session.

An example of such a sound meter can be found here:

<http://www.castlesafetyshop.com/noise-meters/sound-meters/svan979-sound-level-meter-analyser.html>

This is a fairly top of the range instrument with a colour screen and many other features and function designed to try and make life a bit simpler!

5. Where should you take your measurements?

The main question here relates to using a hand-held sound level meter to take readings for use in a noise at work risk assessment. For this application, the guidance to the regulations is quite clear.

You should take measurements at the operator's ear position, preferably without the operator present! If this is not possible (which it often isn't) you should measure close to the operator's ear position but not closer than 15cm

To make this absolutely clear: You should only EVER take readings at or 15cm from an operator's ear position!



Noise maps in glorious technicolour!

On the question of noise maps and whether you should have one, there is nothing at all in the regulations to suggest that this is at all necessary at any point or for any reason!

If you want to make a noise map, all well and good, but they can take a lot of time to put together and actually don't give you much extra information at all.

More importantly, you should absolutely NOT create a noise map until after you have taken plenty of measurements at operator ear positions!

6. Comparing the numbers with the law?

The Control of Noise at Work Regulations 2005 sets out 3 action values, each with two numbers to look out for

Lower Action Value

- Daily exposure for 8 hours (Lep'd) 80dBA
- Peak Sound Pressure Level (Pmax) 135dBC

Upper Action Value

- Daily exposure for 8 hours (Lep'd) 85dBA
- Peak Sound Pressure Level (Pmax) 137dBC

Exposure Limit Value

- Daily exposure for 8 hours (Lep'd) 87dBA
- Peak Sound Pressure Level (Pmax) 140dBC

There are a couple of really important points to note about these levels. Firstly, the Daily exposure figures are just that, they are only applicable if a person is exposed to that level (or the equivalent continuous level - Leq) for a full 8 hours. So this is not just the number you see on the display of the sound meter, it has to be the level that they would have for the full day. There is a simple calculator on the HSE website that can help you work this out <http://www.hse.gov.uk/noise/calculator.htm>

The peak action levels are completely different to this and are there to capture any really high level, but very short duration sounds like a hammer hitting a metal drum. You need to make sure your sound meter is capable of capturing these sounds and, ideally that it can do so at the same time as measuring the Leq! Check out the Castle SONUS meters for an example of what to use here.

<http://www.castlesafetyshop.com/noise-meters/industrial-noise-meter-kits/nk001-logging-sound-meter-system.html>

Action 'v' Limit - what's the difference?

There is one simple, defining difference between the Action Values and the Limit value and that is to do with hearing protection. If you work out that someone is exposed to 112dBA Lep'd for 8 hours, then they are certainly above the upper action value and they would also appear to be above the Limit value.

If, however, you provide that employee with hearing protection and you calculate the effectiveness of that hearing protection such that you know the level is reduced to 78dBA, then you can safely say that they no longer exceed the Limit. They would still be considered to exceed the Upper Action Value. This is because the rule about hearing protection ONLY applies to the Limit Value!

What do you have to do?

They are called Action Values because there are certain actions you must undertake if you exceed them. The simple one on the face of it is the Limit value because, although you're not supposed to exceed it at all, ever, the regulations say that if you do, you must immediately address that and reduce the level – the simplest way, of course, is to provide hearing protection.

Lower Action Value: At this level there are certain actions required by the law as a minimum standard. You can, of course do more if you feel it wise, and many companies do so. Here are some of the actions you are required to undertake

- Attempt to reduce the noise to as low a level as is reasonably practicable
- Provide hearing protection (although it's use need not be mandatory)
- Provide Information, Instruction and Training (This is a topic for another report!)

Upper Action Value: Having employees who exceed this level for 8 hours requires further actions, amongst which is the following:

- Instigate technical and organisational measures to reduce exposure to below this level. This requires addressing things in a certain order: Noise reduction at source, organisation of people to reduce the time they are exposed to the noise and, *as a last resort*, hearing protection!
- Make mandatory the use of hearing protection. This assumes that you have reached the last resort position and need to employ ear defenders to protect your employees.
- Carry out hearing checks, which really means audiometry. This is certainly subject matter enough for another report, so watch this space. In the meantime, check out these two resources for training and products. One important point to be aware of here is that anyone can carry out hearing test so long as they have the right training, you do not have to use an occupational nurse or doctor!
 - Training: <http://www.safetytrainingacademy.co.uk/industrial-audiometry-course.php>
 - Products: <http://www.castlesafetyshop.com/medical-equipment/hearing-testing>
- You need to delimit areas, defining noise control zones, where people MUST wear hearing protection at all times when in that zone. If you have production areas where machinery is only operating intermittently, this can be a problem as noise control zones are independent of the actual noise level. The picture below shows a product that can help here, which is a noise activated sign, so employees are free to remove their ear defenders when the sign is not lit!



- <http://www.castlesafetyshop.com/noise-meters/noise-warning-systems>

7. What do you put into a risk assessment?

This list of elements you should include in a risk assessment comes largely from the HSE guidance so if you want to impress the inspector next time he's round, then you'd be well advised to make sure all of this is included

- You first need to Identify where there may be a risk from noise and who is likely to be affected.
- You need to figure out your employees' exposures, and compare the exposure with the exposure action values and limit values.
- The report should say what you need to do to comply with the law, eg whether noise-control measures or hearing protection are needed, and, if so, where and what type.

- You must Identify any employees who need to be provided with health surveillance and whether any are at particular risk. This is where audiometry comes into its own and can be used to amazing effect with a little care and attention to detail. Getting this part right can be the key to eliminating Noise Induced hearing Loss in your organisation and for that reason, I will probably come back to that in a later report!

It is essential that you can show that your estimate of employees' exposure is representative of the work that they do. It needs to take account of:

- The work they do or are likely to do.
- The ways in which they do the work.
- How it might vary from one day to the next.

The exposure figures you use must be reliable and can be taken from your own measurements or from information obtained at other sites or from manufacturers. One note of caution here – If you don't have your own measurement, you will certainly struggle to defend or mitigate claims in a court of law!

All of your risk assessment findings must be recorded. You need to make an action plan with anything you identify as being necessary to comply with the law, setting out what you have done and what you are going to do, with a timetable and saying who will be responsible for the work.

These risk assessments should be reviewed whenever anything changes or at around 2 years as an outside time limit.

8. How to make recommendations?

Your recommendations should fall out of your risk assessment and will include any measures your company should take to comply with the law. It is a very good idea to extend this to any measure you could take as an organisation to ensure you can be more protected from civil claims! You might include:

- Noise control measures that should be investigated – certainly consider asking for help on this one!
- Hearing protection requirements and how you might start to reduce reliance on it
- Maintenance regimes that could help to reduce noise from worn machinery
- Which employees, as a result of audiometric testing have been found to be at risk of developing noise induced hearing loss and what could be done about it
- Recommendations for training, whether that be for employees in the form of toolbox talks, for directors to highlight their responsibilities, or to those responsible for health and safety.

9. What is the executive summary?

This is the bit that everyone reads. It is a really good idea to put this right at the front of any risk assessment so that busy managers or directors can read it and get an instant appreciation of the issues, the extent of any problem and the recommended solutions – especially if you are asking for something!

- What problems did you find
- How difficult is it going to be to fix the problems
- Who is involved – by job title if not name
- What resources do you need
- How much is it going to cost – if you can state this

10. Where to go from here...

Here is a little section from the HSE guidance:

Competence

You need to make sure that your risk assessment:

- *has been drawn up by someone who is competent to carry out the task; and*
- *is based on advice and information from people who are competent to provide it.*

You, or people within your company, may well be competent in some or all areas. You may, however, choose or need to go to external consultants.

It is very important that whoever is putting together your risk assessment is competent to do so and there are a couple of ways to tackle this.

- Bring someone in to do it for you. This brings the caveat that you should be able to determine whether or not the report they bring to you is any good. At Castle, we conduct many noise risk assessments each year and always monitor the quality of reports being sent out.
 - www.castle-consultancy.com
- You could get someone trained within your organisation, or get yourself on a course so you can do it yourself. Even if you subsequently bring in a consultant, having the training under your belt will certainly allow you to vet any reports and query what you are presented with.
 - www.castletrainingacademy.com

Other Resources

Equipment ownership can be a problem for some companies, who are sensitive to capital purchases. One alternative to this is rental, which can tick many boxes as being an effective and good value approach. The only drawback to rental is that you need to be a little more organised and you can't respond to things that happen in short order.

- www.castlerent.com

