

Get water ready: tanks, pumps and sprinklers

Chair: Malcolm Hackett OAM

Presenter: Dr Justin Leonard



Justin Leonard

I'm looking forward to presenting on water tanks and pumps and spray systems as an augmentation to our protection systems. I guess the challenge with these types of systems is they're active. They're not passive systems like using the right types of materials that aren't affected by fire themselves. And in active systems, there's always the issue of, will they operate, are they reliable, will they work under the conditions.

Let's move through both of those topics in this webinar. What we'll do is we'll start off with a bit of deep thought about where spray systems are appropriate, and what they aren't adequate at all for and then in the second half of tonight's presentation, we'll move into how to actually make them reliable and design them so they'll actually hold up during the event itself.

So, in terms of what can we use them for, I'll take you back to our favourite checklist that I presented and qualified in our first webinar series. And let's have a look at each of the attack mechanisms and see where water sprays are actually effective. So, would that be effective at addressing the impact on a house from a large fire front and for radiant heat? I guess the answer is yes, if you've got an inadequately designed house that's going to face a higher level of radiant heat and flame than it could normally withstand and then a very heavy deluge of water over those vulnerable elements can work. And I guess the amount of intensity that you need to deliver is constant deluge and a constant water film, and it's really only then you can expect things like the windows to actually survive the radiant heat and flame contact that it may be presented with. So, quite a specialist system and very high water delivery rates that need to persist for the entire duration of that intensity.

And if you have a look at fire trucks they actually are quite specifically designed to survive that very intense peak of fire. And there's actually quite a lot of deliberate detail in the way these are designed. Not only the metal piping and sprinkler heads, but a very deliberate effort to put these spray systems very close to the surface they're trying to protect. So their principal design is actually to get water to the surface without being disturbed on its way and to constantly deliver that water film during the entire process.

We move on to ember attack. The answer is a little bit more complex. So obviously water spray is going to be very useful to address where embers land and build up on the external features of a structure. But what they're not going to be able to be effective in is preventing embers getting through gaps and getting into the cavities of the house which typically stay dry during a deluge or being sprayed with water externally. So, you know, water spray systems on and around the house can help to wet down those surfaces and those external ignitions, but they don't necessarily address all the key spots.

And I guess another key point here is where do you actually put these spray systems to actually put water onto the areas that are most appropriate? I find this is a fairly interesting picture because it shows quite an effective sprinkler type, which is the impact sprinkler. Which is quite good at delivering water to a great range or area under strong winds. Any of the finer delivery that gets projected out actually just gets carried away with the wind. And you can actually see how much has been carried with the wind here by the presence of a rainbow in the foreground.

It's interesting to see where the water does and doesn't get. For instance, the eave fascias in this picture actually appear to be quite dry. And, obviously, water delivered from these locations wouldn't necessarily for example wet down the windows. A more appropriate one for say wetting down windows or wetting the areas around the house and addressing the places where the debris might build up like the fine embers might land, is to put these types of chopper sprinklers or impact sprinklers in around the periphery of your house and actually spray them back onto the house and the broader surroundings.

And even if we put water on all of these items, the water doesn't actually seal the typical gaps and entry points that embers can reach into the building cavities. Here's a real example of a typical ridgeline, it's actually a ridge capping designed to keep the water out of a roof even if it's driven at quite an angle, but that's the typical places where embers can move inside and actually ignite those ridgelines. So, water sprays actually don't address this type of attack. And it's important to really address the key issue of what spray systems do not cover. They aren't a panacea for all things, they definitely miss quite a few things, this for example.

Another obvious one is they're not going to seal a gap at the top of a roller door. You'd actually have to wet down everything inside your garage to be able to use water sprays as an effective way to mitigate that type of risk. So, it's really a complementary approach to deal with certain things rather than a comprehensive fix.

So, moving on to adjacent buildings and combustible objects. Yes, they can be used, but like trying to deal with a large fire front with radiant heat and flame it requires a lot of water and quite a specific design of spray system to either wet down the adjacent building, or combustible element, or put enough water on your own house to withstand the heat load from that adjacent building or combustible object. Now, buildings take hours to burn down and you would actually need the water at a very high delivery rate to persist for the entire time that that adjacent building or element burned.

And typical elements like decking can require quite an amount of water, but can be also quite effective if you constantly wet those elements down.

Vegetation requires a lot of water and I guess that vegetation can quickly dry out once the water stops.

Water on fences can be another approach although obviously once again it's far better to move to a non-combustible fence or no fence at all.

So, surface fires. Yes, this is a particularly effective and easy one to address from water sprays, because water will land and typically wet out these surfaces. An intermittent wetting of these surface areas will be quite effective at eliminating that as an issue. And that might be tan bark under windows or any horizontal surface where the debris blows up and starts those small fires.

The last three on our list, like branch strike or tree strike: ineffective. And that's fairly obvious. Wind and wind-blown debris and the impact of those physical impact, not effective at all. And, of course, smoke and smoke exposure, the spray systems are just not going to be effective in those ways.