Is my family's home your obvious defect? Photo credit 'echoe69 CC BY-ND 2.0'

TAKING THE 'DEFECT' OUT OF TREE RISK-BENEFIT MANAGEMENT AND ASSESSMENT

By David Evans

We've grown up being told that when we manage and assess tree risk, we should look out for tree 'defects'. One problem with this approach is what we're commonly calling defects often aren't defects at all.

Hollows, cavities, decay colonies, and deadwood, are natural features of older trees that usually have valuable habitat benefits (Fig. 1). It's seldom these natural features, with benefits, are risks that aren't Acceptable or Tolerable. So, why are we labelling them as defects *before* we carry out a risk assessment?

Ditching the defect

Back in 2020, the word defect was removed from all of VALID's Tree Risk-Benefit Management Strategies. Obvious Tree *Defects* were replaced by Obvious Tree *Risk Features* (Fig. 2). Now, defect is finally going to be removed as the D-word in the VALID mnemonic. The tree risk defect issue has been knocking at the door of reasonable, proportionate, and reasonably practicable tree risk-benefit management and assessment for some time now. This is the case for the next stage of evolution in our tree risk vocabulary, and how it can improve our decision-making.

Fig. 1 (right):

Defects & Hazards v Habitats & Benefits.

Illustration credits: Hazards 'Forestry Commission', Veteran Tree 'English Nature'.

Fig. 1: Hazard tree

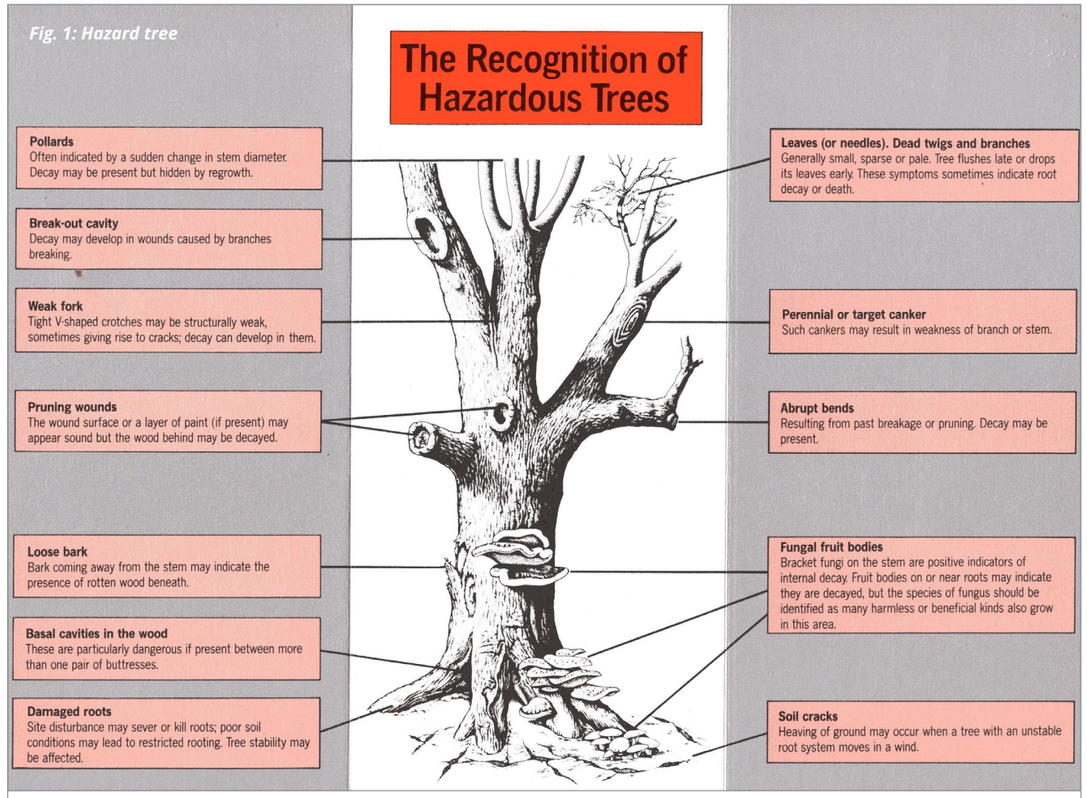

Fig. 1: Veteran tree

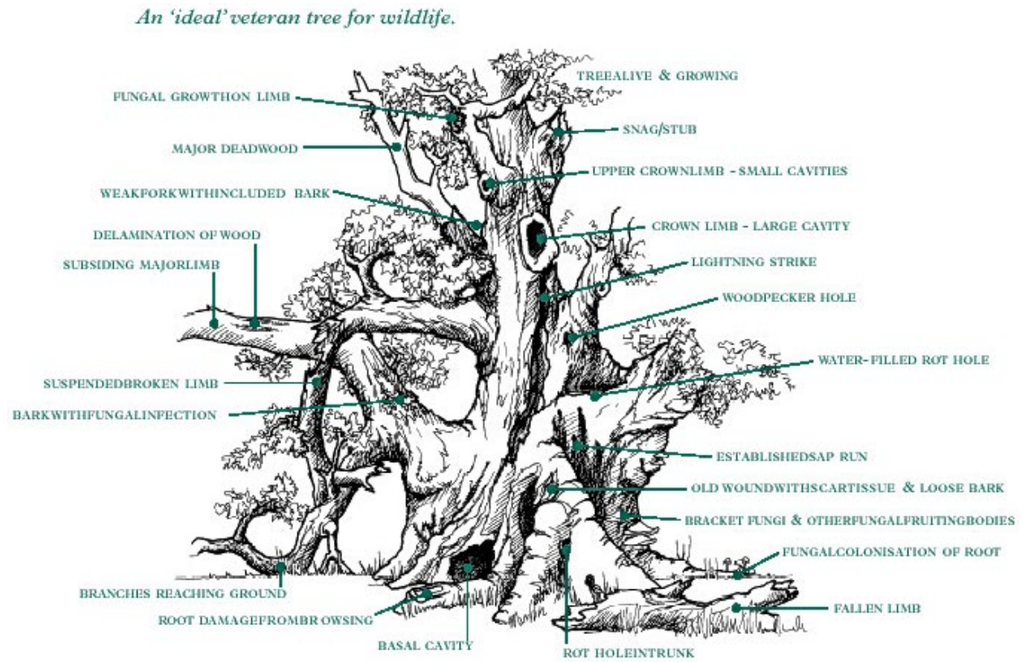

Fig. 2

Compared to everyday risks we readily accept
our risk of being killed or injured from trees or branches falling is extremely low
The risk over a year is less than a 400km/250mi drive (one in a million)

VALID

Obvious Tree Risk Features Guide | Tree Risk-Benefit Management & Assessment

v8.0

1 When might a tree be dangerous?

Trees with the highest risk are the easiest to spot

Be watchful after storms

1 When a tree has a risk that might not be Acceptable or Tolerable, it'll usually have an obvious tree risk feature you can't help but notice. If you come across a tree with anything like these obvious features, it should be looked at by an Arborist (tree expert) who's been trained in tree risk assessment.

1.1 Root failure

Storms can break tree roots without blowing them over

Signs to look out for are

Change in angle of the trunk
Large cracks in the soil
Hump in the ground on one side

2

1.2 Hanging branches

Don't forget to look up

Branches can break during storms and still hang on

Sometimes they can get stuck up there for quite a while

3

1.3 A crack or split into the wood, beyond the bark

When trees bend and twist in storms the wood can split and crack

Vertical cracks in the bark are just the tree growing well there's no need to worry

4

1.4 Decline & death

To stay healthy and strong trees need 'solar panel' leaves to make food

When trees suffer they often have much less leaf cover and many dead branches

Standing dead trees have great habitat benefits but need checking

5

1.5 Decay fungi fruiting bodies

To decay fungi these 'fruits' are like apples to an apple tree

Decay fungi and trees mostly live happily together creating essential habitat for wildlife

Fungi can sometimes 'eat' too much wood and weaken the tree

6

1.6 Construction damage

Tree roots are surprisingly shallow

Trees can't repair wounds
Digging or building near trees makes them very vulnerable to damage

7

www.validtreerisk.com

Photographs
Jake Miesbauer, Michael Richardson, Roy Finch, Mark Hartley, Rick Milson, Andrew Benson, David Abrahams
Felicity Cloake & Wilf, David Humphries, Jack Prynn, Moreton Arboretum, Josh Behounek, Jan Allen

Fig. 2 (Left):
Tree risk 'features' that might need a closer look.

The rise and fall of defect

This is a potted history of defect and risk evolution in arboricultural publications.

1987

Forestry Commission, 'The Recognition of Hazardous Trees' (Fig 2)
No defects are mentioned. Neither is risk.

1994

Matheny & Clark, 'A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas'
Has a short section called 'Wood Decay and Tree Defects'.
No mention of risk, though.

2000

Forestry Commission Practice Guide - David Lonsdale, 'Hazards from Trees: A General Guide'
We have reference to *'mechanical defects'* as a cause of hazards. Appendix 1, Tree Hazards: Recognition and Recommendations, doesn't include the defect word. Still no mention of risk.

2000

English Nature, 'Veteran Trees: A guide to risk and responsibility'
First raises the existential issue at the heart of the matter, that defects might not be weaknesses. That said, a defect is defined as a *"significant potential for failure"*. We have our first mention of risk.

2003

USDA Forest Service, 'Urban Tree Risk Management'
Has a chapter on 'How to Detect and Assess Hazardous Defects in Trees'.

2005

Mike Ellison, Journal of Arboriculture 31 (2), 'Quantified Tree Risk Assessment Used in the Management of Amenity Trees'
Defines a defect as something that's increasing the Probability of Failure.

2011

National Tree Safety Group (NTSG), 'Common Sense Risk Management of Trees'
Introduces us to *obvious defects*. It looks to get to grips with several problems of terminology in a section titled, 'Defect, obvious defect, hazard and risk'. Here, the NTSG points out that defect, hazard and risk can be confused with each other. They say, *"a defect in the context of the growing environment of a tree is a structural, health or environmental condition that could predispose a tree to failure"*.

2016

VALID
Defect is the D-word in the VALID Likelihood of Failure mnemonic.
Defect is also part of the 'Obvious Tree Defects Guide'.

2020

VALID
Defect is dropped from the 'Obvious Tree Defects Guide', and it's updated to the 'Obvious Tree Risk Features Guide'.

2022

VALID
D for Defect in the VALID Likelihood of Failure mnemonic to be replaced by D for Decay.

The horns of the D-ilemma

When I was putting VALID together as a "likelihood of failure" decision-making helper in 2016, I ran some field trials to test it out. Dr David Lonsdale came along to the Great Windsor Park outing in the UK. He wisely pointed out that whilst Vitality, Anatomy, Load, and Identity are all neutral words, Defect was negative. That's because defect commonly means something that's a *shortcoming*, an *imperfection*, or a *flaw*. Defect isn't a neutral, amber word. Defect is a red word. Defect is anchoring you to a red starting point *before* you've even evaluated what you're looking at.

Two sides of the same coin

Trees that host decay colonies, and have hollows or open cavities, often have high safety factors – a safety factor is how much stronger a tree is than it needs to be for an expected wind load. Our Owl's family home, which we're currently labelling a defect, is usually much stronger and stiffer than early mature trees that we're happy to categorise as defect-free. A tree with good vitality that's hosted a decay colony for a long time is likely to be stronger and stiffer than if it had a 'sliding doors' parallel life and remained decay-free (Fig. 3). This is down to a combination of the improved material properties of response growth, and the geometric benefits of increased section-modulus (double the diameter and the load-bearing capacity increases by a factor of 8).

Mind your language

The language we use affects how we think and influences our decision-making. Calling a natural tree feature, with habitat benefits, a defect *before* assessing the risk is a *'begging the question'* fallacy. Begging the question is what's called a logical fallacy, or cognitive bias. It's a type of circular reasoning where the *premise* assumes the *conclusion*. That's a bit of *bafflegab* that requires some thought and unpacking. Let's break it down to find out why it's a problem. Here, the *premise* is that you're looking at a defect. It is pulling you to the *conclusion* that the tree part is defective and therefore something needs doing. Not only is defect tugging away at our own biases when we're managing and assessing risk, the common understanding of what defect implies will also be in the minds of judges, coroners, and members of the public. If someone is killed or injured by a tree that had a defect, and a claim or enforcement action is threatened, no matter how low the risk, you're already on the back foot because of the language you've used.

Fig. 3: *Symbiosis? - Phellinus badius coexisting with Eucalyptus saligna.*

Photo credit: Mark Hartley

Obvious tree risk features

It's all too common for a tree defect, obvious or not, to be read as shorthand for a tree risk that needs reducing. The D-word's become a synonym for hazard; with all the problems of risk-aversion that come with the H-word. With tree risk-benefit management and assessment, the time has come for us to step up the next rung of the evolutionary ladder. If we see something conspicuous in a tree that triggers a closer look, it's not a defect. It's an *'obvious tree risk feature'* until it's been assessed.

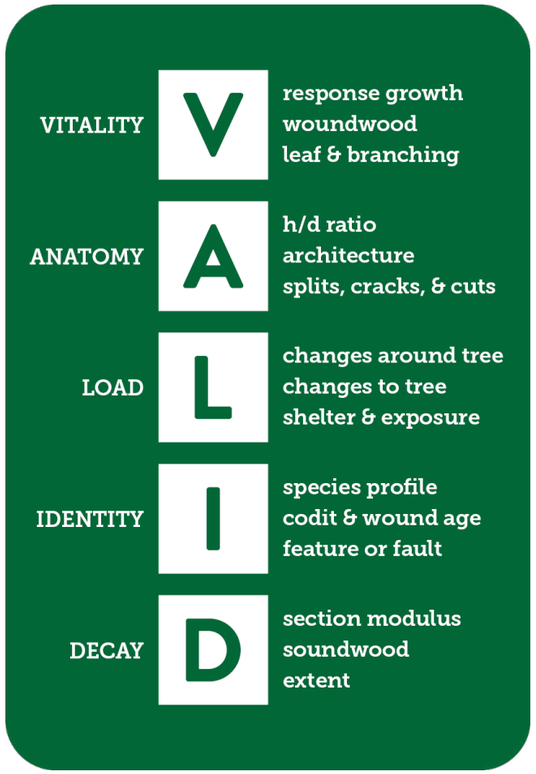

Fig. 4 : *Defect to be replaced by Decay*