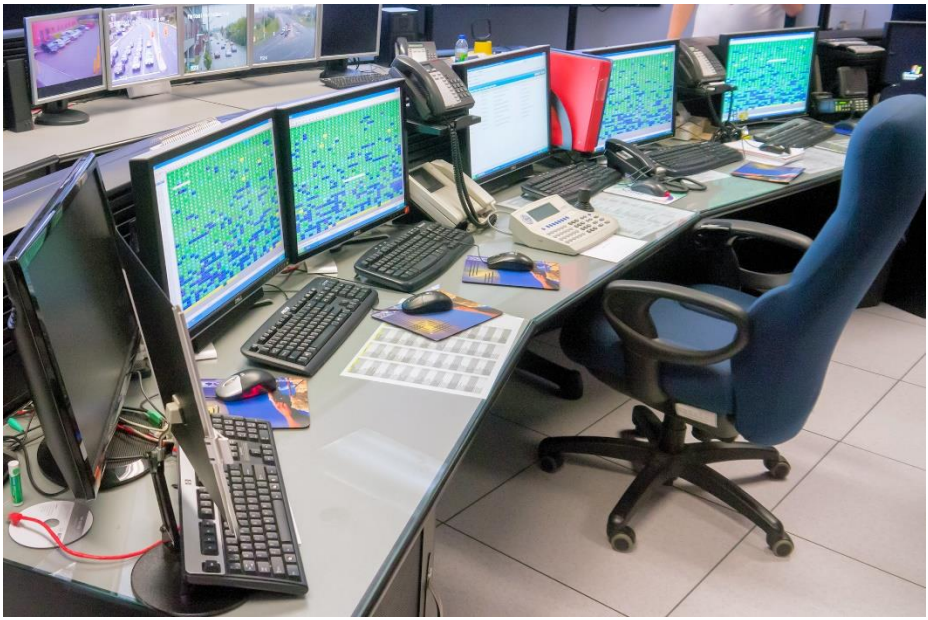
The Future of Human Factors?



Human factors have always been important when considering how accidents may be prevented or evaluated. In this article, John Ridgway explores how such considerations may play out in the future. In particular, one has to consider how the factors that influence safety-related decision-making will be judged after one takes into account the methods and processes that are likely to be in place.

A palpable tension was hovering in the air like the lingering stench from a cheap e-cigarette. A court that had previously gasped from want of belief rather than fresh air, now held its breath as the Counsel for the Prosecution rose to her feet to deliver his closing speech.

"Members of the jury," she opened, "you have been witness over these last two days to a tragic story of woeful dereliction, matched only by an even more woeful failure to apply the ethical judgment that all members of the public have a right to expect from those given the responsibility of ensuring their safety. This was not a failure of a component, as the Defence would have you believe, but a failure that struck at the very heart of the decision-making process. A failure of decision-making that led to the tragic deaths of Mr and Mrs Cooper as they embarked upon what should have been a perfectly safe journey upon the Gender-Neutral Royalty's highway.



You have heard a truly bizarre attempt from my learned Counsel for the Defence to exonerate the defendant on the grounds of logicality. No doubt these arguments will be repeated shortly, but, as you listen to them, I ask you once again to consider how such a failure of judgment was possible. How can an operator instructed to set road signs that are vital for the safety of the road user, possibly justify setting them in such a way as to knowingly increase the risk to not one, but two, members of the general public? Normally when considering operator fallibility, one is confronted with unfortunate errors that are quickly regretted. But have you heard one note of contrition from the defendant in this court? No! Just an insistence that the twisted logic applied should be accepted as the optimum safety decision to be made under the circumstances.

Well, I'll leave you, the members of the jury, to decide upon that matter yourselves. However, I put it to you, that any right-thinking mind would look upon the decisions made on that fateful day and come to the inescapable conclusion that the defendant is guilty as charged; guilty not only of gross neglect but also of a reasoning that you must surely agree was most egregiously flawed. I thank you all."

As the murmurs spread through the auditorium, it was clear that the speech had gone down well. The court had been invited to understand that this was not a tragedy borne of physical frailty. Instead, the frailty lay in an inability, under stress, to apply a reason and rationality that would be recognisably ethical to those who were in a position to judge. Today, such a judgment was being made by twelve of the defendant's peers, and it mattered now, more than ever, that the Counsel for the Defence could make a strong enough case for believing that not only rationality and reason, but also ethicality and morality, had lain at the heart of the defendant's decision-making. A hush descended upon the auditorium as she rose to her feet and turned to the jury.

"The frailty lay in an inability, under stress, to apply a reason and rationality that would be recognisably ethical".

"Members of the jury, my learned Counsel for the Prosecution has succeeded admirably in fomenting righteous indignation, but I put it to you that emotions should be set aside when determining your verdict. I have carefully explained over these last two days the complex interplay between traffic congestion and road safety. I have ably shown that all usage of the Gender-Neutral Royalty's highway entails risk, and that this is a risk that each and every one of us accepts when we step into our vehicles.

Indeed, there are only two traffic states that are truly safe: firstly, when the congestion is at its minimum because the road is empty, and secondly when the congestion is at its maximum, resulting in a gridlock that has ground the traffic to a halt. I have also shown you the risk profile curves that demonstrate that the accident risk is at its maximum at the mid-point just as the laminar flow of traffic starts to break down and shock waves start to develop within the traffic flow. It is at this point of flow breakdown, the onset of chaos if you will, where one sees the occurrence of unexpected queues that are the main cause of rear quarter collisions. Furthermore, it is at such a point that the temptation to make dangerous lane changes is at its greatest.

Therefore, the operator in charge of setting signs has a duty to implement traffic management strategies that move the traffic away from this phase transition whenever possible.



Sometimes this will entail diversions to alleviate traffic flow on a particular stretch, but it may also require the increasing of traffic volume through judicious means, in order to quickly encourage a slowing of traffic. This is all that the defendant was doing on that fateful day. By setting lane change instructions that encouraged Mr and Mrs Cooper into a collision with another vehicle, two major benefits had been identified. The traffic behind the resulting accident would grind to a halt, and the road ahead would empty. This win-win situation was marred only by the sad deaths of the couple concerned. However, since the defendant had anticipated and avoided an even worse accident, who amongst us can say that the wrong decision had been taken? I put it to you that the decision was taken with safety optimisation in mind and that the decision was taken under the most difficult of circumstances. On such a basis alone, I must conclude that the only logical decision available to you is to acquit. I therefore appeal to your own respect for logic and ask that you draw this conclusion: By all reasonable judgment, the defendant is not guilty."

"The seeds of doubt had been successfully sown as the jury members were now being asked to place themselves in the position of the defendant".

With that, the Counsel for the Defence retook her seat before turning to her assistant. A small but discernible smile played across her face as she listened to the appreciative mutterings now echoing within the courtroom's small confines. The seeds of doubt had been successfully sown as the jury members were now being asked to place themselves in the position of the defendant. The crux of the matter was this: Had they found themselves in the same position, how would they have reacted? Put another way, how normal was the thinking of the defendant? Was this, at the end of the day, the only criterion that we should be applying to determine ethicality? As the auditorium continued to grapple with these questions, the murmuring grew ever louder, to the point that the judge felt it necessary to intervene.

"Silence in the court!" she bellowed. "Members of the jury, you have now heard the closing statements from both counsels. I ask now that you adjourn to make your decision."

By now the tension in the courtroom was barely tolerable, and so it was to everyone's advantage that the verdict was returned with the minimum of delay. As the court reconvened, the judge once more struggled to regain control.

"Silence! May I remind you that this is a court of law." Having thus re-established her authority, she slowly turned to the jury. "Members of the jury, have you reached a decision upon which you are all agreed?"

"We have."

"And what is that decision?"

"Guilty, M'lady."

Not for the first time, the judge had a crowd management issue to deal with as the auditorium erupted into loud cheering.

"I will have silence in my court!" she maintained with a well-judged *fortissimo*. Turning to the defendant, it was now the judge's chance to draw conclusions.

"You have been found guilty of the most appalling error of judgment, and for that there can be only one verdict. But before I pass sentence, I feel it only fair to draw attention to an important principle. So often in these situations it is the operator at the coal face that is brought before this court, and yet no accident can be said to have been caused by a single factor. In so many cases one has to take into account systemic failings that made the operator error all the more possible. This case is no exception and so it would be remiss of me not to point out that the operator would have not made this calamitous decision if the software engineer who had programmed it had ensured the inclusion of the necessary subroutines for checking compliance with all relevant ethical constraints. Consequently, I will be advising that a review be held into all future artificial intelligence programming, as employed on automated safety systems development for the Gender-Neutral Royalty's highway. In the meantime, I sentence the defendant to be immediately decommissioned and add that it shall not be re-commissioned until such a time as the safety case has been approved for the regression testing of its software upgrade. I would also like to thank the jury for its most sage judgment and I advise that you should all be excused further jury service until after your power units have been refurbished. This court is now closed."

Now, and only now, the excesses and exuberance of the auditorium were to be encouraged. A difficult judgment had been made in a manner that appeared to be to everyone's satisfaction. But as the clamour in the public gallery slowly subsided, it was only the most observant and alert amongst them who will have witnessed the Justices' Clerk leaning forward before deftly switching the judge into standby mode.

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John Ridgway, Retired

Following 30 years in various quality and safety assurance roles, whilst working for a contractor developing traffic management solutions for both domestic and foreign clients, John is now enjoying a relatively uneventful retirement on the edge of the North York Moors. John would like it to be known that he learnt everything he knows regarding the UK's judicial system from watching poor courtroom dramas.

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