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# ON THE FAST TRAIN TO NUCLEAR DISASTER? BIAS AND PHOBIA AS CHALLENGES TO CHINA'S PURSUIT OF NUCLEAR ENERGY

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**In 2011, China's nuclear power ambitions were shaken, first by the Fukushima disaster which undermined public trust in nuclear energy worldwide, then by the spectacular crash of China's flagship transportation project – the high-speed rail. This issue of the NTS Alert looks critically at the negative comments in the media, and in academic publications, on China's development and its nuclear energy programme, and offers a wider and more optimistic perspective on both China's progress and the safety of nuclear energy.**

*Nuclear plants in China: ticking bombs or keys to development?*
*Credit*: Atomic Energy of Canada Limited.

## Contents:



## Introduction

In recent years, the world has witnessed a 'nuclear renaissance' (WNA, 2011b). Faced with the prospect of rising fuel prices, concerns about climate change and a slowdown in the production of hydrocarbons, many countries showed significant interest in the opportunities afforded by nuclear energy.

This trend was dramatically shaken on 11 March 2011 when a devastating tsunami crippled Japan's Fukushima Daiichi nuclear power plant (Cooke, 2011). The disaster had significant impacts on the perception of nuclear energy both in Japan and abroad. Several countries, primarily in Europe, called for existing or planned nuclear energy projects to be reviewed, or abandoned (STRATFOR, 2011).

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The tide of anti-nuclear sentiments post-Fukushima flowed over China's impressive nuclear programme – 36 reactors in the coming decade (Biello, 2011). After all, it was argued, if a nuclear disaster could overwhelm Japan, one of the world's best organised and most technologically advanced nations (Applebaum, 2011), then what more China, whose huge industrial projects have long been viewed by Western commentators as riddled with corruption, corner-cutting, mismanagement and disregard for the environment (Hilton, 2011; Huus, 2011; Kahn and Yardley, 2007). Hence, it comes as no surprise that the Fukushima disaster only reinforced concerns about China's nuclear projects (Tu, 2011).

The perspective that China might not be prepared, or responsible enough, to handle nuclear power gained momentum on 23 July 2011 when two high-speed trains collided along a viaduct near Wenzhou leaving over 40 people dead and many more injured (Wenzhou Crash, 2011), most probably due in large part to human error (Wang, 2011). This tragic event attracted significant comment, with suggestions that it is symbolic of the numerous dangers associated with China's development, and even that it should serve as a 'dark lesson' for China's nuclear project (Hilton, 2011). Such bold claims invite critical questions.

A more careful look at the narrative surrounding the Wenzhou crash suggests that the concerns over the safety of China's nuclear plants or other industrial programmes are perhaps more an expression of entrenched prejudices and phobias than the result of any kind of sound analysis. To be sure, it is sensible to take away lessons from large industrial accidents; however, the comments on the Wenzhou crash hold little sense of proportion or appropriate consideration of the wider context. Also, the dark prophecies about the safety of China's nuclear programme seem to be based on biases against both China and nuclear energy in general.

This NTS Alert will seek to expose such claims and assumptions, and in the process inject a wider, more critical perspective into the current debates on China's development and the future of nuclear energy. It will offer a critique of the narrative that followed the Wenzhou crash and it will expose some limitations of the current discourse on the safety of large industrial undertakings in China. It will further argue that, contrary to popular beliefs, such projects as high-speed rail and nuclear power are potential solutions to, and not sources of, challenges to human well-being and security in China. In pursuing the argument, this NTS Alert will refer to media and academic publications. The discussion in the NTS Alert also owes much to the views gleaned from government officials, representatives from non-governmental organisations and academic colleagues during the author's field research trips to China and Japan in August and September 2011.

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## High-speed Trains and Nuclear Power: Riding on the Same Track?

High-speed rail and nuclear power may seem unconnected. Yet, these two projects are not that far apart when it comes to their scale and potential significance. Both are considered to be among the largest and most complex commercial engineering projects in contemporary China (Tu, 2011). Both have won attention and support from senior leaders on account of their role in the country's economic development. More specifically, it has been observed that both the nuclear energy projects and the high-speed rail programme follow a similar strategy of importing key technologies from abroad in 'technology for market swaps' (Tu and Livingston, 2011). Last, but certainly not least, both are considered prestige projects (McDonald, 2011b). From the perspective of these similarities, studying the reactions to the Wenzhou crash can offer valuable lessons for the nuclear industry in China.

### Wenzhou: The Construction of Grandiose Meanings

The 23 July collision in Wenzhou triggered an outcry both in China and abroad (A New Third Rail, 2011). Far from being seen as an ordinary accident, tragic and calling for a careful investigation, yet not unprecedented or particularly devastating, the Wenzhou collision quickly came to be presented as evidence for much greater claims.

According to many of the comments that immediately followed the accident, the event was not only a 'blow' to China's high-speed rail programme and a 'fiasco' as far as the programme is concerned (China Orders, 2011; Epatko, 2011; Hilton, 2011; see also Anderlini, 2011; Moore, 2011), it also symbolised all the real or imagined problems commonly associated with China's development (for example, Lim, 2011; Hille, 2011). The tragedy became a lightning rod for all sorts of claims. Just a few days after the

*Since 1981, the TGV, France's famed nuclear-powered train, has transported over 1 billion passengers, marking the great commercial, political and social success of human ambition and progress in a country which meets 75 per cent of its energy needs through its nuclear power plants. Will China follow a similar track?*

*Credit*: Frederic Dinh / flickr.

accident, some Western newspapers firmly announced that the collision was undoubtedly caused by China's 'corruption', 'corner-cutting', 'untouchable bureaucracy' and lack of responsibility (Dean and Page, 2011; Hilton, 2011). A Washington Post journalist went so far as to state that 'China's bullet-train experience shows what can go wrong when an unelected elite, influenced by corrupt opportunists, gives orders that all must follow – without the robust public discussion we would have in the states' (Lane, 2011). Others lamented China's 'reckless' or 'breakneck' growth and its dangerous 'Great Leap Forward mentality' (McDonald, 2011a; Dean and Page, 2011; Lim, 2011).

The tirade against the perceived deficiencies of China's system soon took the form of dire warnings against China's nuclear power programme. With the speed of a bullet train, certain commentators moved on to suggest that the Wenzhou collision carries lessons for, and demonstrates the dangers of, China's nuclear power ambitions (Tu and Livingston, 2011; Li, 2011). Some journalists believe that a 'curse of corner cutting, secrecy and corruption' that dominates China is more likely than not to have 'chilling consequences' in the nuclear sector (Hilton, 2011).

It seems that the collision only added to the already widespread suspicions about the safety of China's nuclear projects. Safety concerns were raised as soon as China embarked on its massive nuclear energy development project in the early 2000s (Bradsher, 2009b). Already back then, some commentators worried about the safety of China's nuclear plants in the light of corruption and cost-cutting being reportedly endemic in certain Chinese industrial enterprises, such as toy factories (Bradsher, 2009b). These concerns gained momentum with the Fukushima disaster (Vivoda, 2011).

The Wenzhou incident was not only taken as an indicator of systemic deficiencies in China's management system, it was also extrapolated into a symbolic warning that humans are doomed to fail in their efforts to tame the 'disastrous' nuclear power. Tu and Livingston (2011) state that the Wenzhou accident indicates that 'no amount of technical innovation can eliminate the risk of human-induced errors associated with the design, construction, operation, maintenance, decommissioning and disaster response of nuclear power plants.'

Notwithstanding the post-Fukushima feelings and the widespread popular opinion that China does not measure up when it comes to safety, up until the Wenzhou collision, critics of China's nuclear projects had been unable to point to any case serious enough to back their claims. While it is true that, like Japan, China is prone to earthquakes, 'plants being built [there], unlike Japan's older plants, are new-generation models that do not rely on electrical power for their cooling systems but instead are fitted with large tanks of water operating by gravity in the event of a crisis' (Richburg, 2011). Similarly, as tragic as they were, it would not be credible to use cases of compromised safety measures in toy or other factories (even if not apparently exaggerated; see O'Neill, 2007) to illustrate and support concerns about China's flagship energy project. The collision of two new high-speed trains which had been part of one of the most high-profile industrial projects in China, however, represented a most satisfying exemplar.

In sum, far from being seen as a mere stumble that may yet prevent a fall on the steep pathway towards progress and modernity, the Wenzhou tragedy has largely become a symbol of all sorts of problems and dangers associated with China's rapid development. As such, it has, and is likely to be, used as a vivid argument against China's nuclear programme.

## A Critical Look at the Criticisms

It is sensible to ask serious questions after any industrial accident, especially if it is a tragic collision involving new, highly sophisticated trains. Yet, an honest and meaningful analysis must maintain a sense of perspective. It must also be unbiased and placed in the right context. These requirements seem to be lacking in most of the commentaries that followed the Wenzhou tragedy.

For a start, as tragic as the Wenzhou crash was, it was one of relatively few railway accidents in China. Indeed, when compared with other nations, such as the US and India or even some European countries, China's railways seem to have a significantly better safety record (Zeliger, 2011; Vitchek, 2011). To offer only one example, in just one week of July (the month of the Wenzhou crash), over 100 people died in train accidents in India (Choudhury, 2011). In light of the above, claims about poor rail safety as a feature of China's political system or management style seem unfounded, to say the least.

Generally, mantras about the Wenzhou accident being a result of China's political system, the corruption within the country or its 'untouchable bureaucracy' seem based on preconceived ideas, especially since they were expressed before the release of the official investigation results. In fact, there is no evidence that the accident was a logical result of some inherent flaws in China's system. As observed by Jin (2011), 'China's regular trains in the past used the same management system, but had a satisfactory safety record.' Putting the blame for the accident on China's political system may indeed seem rather unfair, even hypocritical. After all, when a high-speed train derailed in Germany in 1998 resulting in the death of over 100 people (Eschede Disaster, 1998), no one claimed it was a result of the German political or economic system.

Similarly, it is an exaggeration to suggest that the Wenzhou crash invalidates high-speed rail development in China. As Jin (2011) noted, 'The modernization of China's rails, from original conception to final installation and integration into the system, is an enormous project. The multiple-unit trains have run for billions of kilometers, and one accident doesn't necessarily show the unreliability of the entire scheme.'

What the narrow criticism of China's high-speed rail misses are the tremendous short- and long-term socioeconomic benefits of the project. While it is true that it has been an extremely costly (perhaps even too costly) enterprise (McDonald, 2011a), it is important to note that the construction of high-speed rail has been part of a large economic stimulus package that China had introduced to counter the domestic effects of the 2008 global downturn (Bradsher, 2009a). High-speed rail in itself has the potential of further integrating China's economy, and allowing cheaper, less polluting transportation of both people and goods. When people switch to high-speed rail, they free older tracks for use by mines and by shippers who would otherwise use road transport (Bradsher, 2011a).

Furthermore, while the outrage at the death of 40 passengers is justified and understandable, one must bear in mind that this death toll fades in comparison to the approximately 180 people killed *daily* in traffic accidents in China (China Bus Crash, 2011). On the very day of the Wenzhou crash, a fire aboard an intercity bus in Henan Province killed 41 people (Bradsher, 2011b). High-speed rail presents an attractive alternative to road passenger transport, and indeed, it has been reported that the Beijing-Taijing high-speed train connection has led to an over 30 per cent decrease in intercity bus transport (Beijing-Tianjin, 2011). One could thus suggest that, even if one bullet train were derailed every week, high-speed rail would still be saving thousands of lives that would otherwise be lost in road accidents (Vitchek, 2011).

It is true that in China, just like in many other industrialising and developing nations, 'the rush to produce will frequently outweigh safety concerns' (O'Neill, 2007). Thus, certainly, there are problems with corruption, pollution and corner-cutting. Yet it must be remembered that 'in contrast with its performance in industries like toys, China has a strong safety record in industries receiving top-level government attention' (Bradsher, 2009b). In many cases, the benefits to the people far outweigh the risks, particularly when seen relative to other available options.

The Wenzhou crash should not therefore be seen as symbolic of potential problems in China's high-speed rail project as a whole. It should also not serve as an argument that it is too dangerous to develop complex industrial projects such as nuclear power plants. The next sections will show that, as with the rail project, the dangers of nuclear energy have been overstated, and that the nuclear option in fact offers multiple benefits and thus represent the solution to, and not the source of, human insecurity.

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## The Wrong Questions about Nuclear Safety

It is difficult, if not impossible, to find any evidence that the Wenzhou crash, or any other accident for that matter, should be seen as a 'wake-up call' (Feickert, 2011) for China's nuclear industry. In fact, as argued in this NTS Alert, the significance of the Wenzhou crash has been blown out of proportion. Also, despite numerous claims, no firm evidence has been presented showing that safety measures might be compromised due to corruption, corner-cutting or the Chinese style of management (Spegele, 2011). While there have been cases of corruption in the nuclear industry, those cases could not have resulted in hazardous conditions at nuclear power plants (Bradsher, 2009b).

However, it appears that the lack of evidence has not in any way convinced critics of nuclear programmes, both in China and elsewhere, that nuclear power is safe enough. As demonstrated by the Wenzhou accident, even a railway crash can lead to concerns about nuclear plants. This suggests that the problem is perhaps far more fundamental.

### Separating Fact from Myth

Goldstein (2011) rightly points out that '[m]uch of the on-going global debate about whether nuclear power is "safe" … is meaningless because it poses the wrong question. The issue isn't whether nuclear power is "safe" compared to some theoretically perfect form of electricity generation, but whether it's "safe" compared to the other technologies we have for generating reliable, on-demand, base-load electrical power.'

Many continue to believe that a nuclear accident could cause a high number of deaths, and have significant health impacts. In order to examine the issue of how 'safe' nuclear power really is, it is important to first dismantle the myth that nuclear power is uniquely dangerous when it comes to electricity generation (Goldstein, 2011). The notion that nuclear power is a serious threat is, however, not borne out by the data from analyses of the impacts of nuclear-related accidents.

*Chernobyl is the worst nuclear power plant catastrophe the world has seen. Nevertheless, the economic, social and public health effects have had much less to do with radiation exposure than the fear of such exposure.*

*Credit*: Kamil Porembinski.

Take the case of Chernobyl, where the worst possible chain of events was seen. A total meltdown of the reactor core occurred in a dangerously constructed facility, one that was simply 'a massive scandal' (Rotkiewicz, 2006). The result was 10 days of free emission of radionuclides into the atmosphere. The accident is still used as a yardstick for how bad things can get; Fukushima was compared to it (Yemma, 2011). However, despite the admitted severity of the Chernobyl disaster, the UN and the World Health Organization (WHO) confirmed only between 30 and 50 deaths as a direct result of radiation exposure (UNSCEAR, 2011; WHO et al., 2005).

What is more, apart from an increase of cases of thyroid cancer reported in children and adolescents who were exposed at the time of the accident, few to no direct health effects of radiation exposure were seen. Even the link between an increase in thyroid cases and radiation from the disaster has been cast into doubt. It has been argued that the increase could be due to the introduction of screening after the disaster, and furthermore, that the data has been presented out of context (for a comprehensive discussion, see: Jaworowski, 2010). Numerous reports prepared by the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) find that:

> there is no evidence of a major public health impact attributable to radiation exposure two decades after the accident. There is no scientific evidence of increases in overall cancer incidence or mortality rates or in rates of non-malignant disorders that could be related to radiation exposure. (UNSCEAR, 2011)

If all radiation-related accidents over the period 1945–2001 are considered, only 134 people (including the Chernobyl casualties) died as a direct result of radiation exposure (Jaworowski, 2009). No one was hurt or died in the infamous Three Mile Island accident (Seymour, 2011) and the only fatality of the Fukushima disaster so far has been a worker killed by a crane (Saletan, 2011). According to Durodie (2011), popular suggestions that Chernobyl, or any other nuclear accident, could cause thousands of death are based on the wrong assumption about the effects of low levels of radiation.

## Comparisons with Other Methods of Energy Generation

In comparison to other methods of generating energy, nuclear power seems more human-friendly. For example, coal smog caused the death of around 12,000 people in London between December 1952 and February 1953 (Bell and Davis, 2001). The rate of death from the burning and mining of fossil fuels continues to be tremendous. According to the *Environmental Outlook to 2030* published by the Organisation for Economic Co-operation and Development (OECD) in 2008, fine-particle outdoor air pollution caused nearly 1 million premature deaths in the year 2000, of which 30 per cent was energy-related. In China, the annual death toll from coal mine accidents reached 70,000 in the 1950s and 10,000 in the 1990s (WNA, 2011a). Even hydropower, often considered 'green', has been far more dangerous than nuclear energy. The collapse of a hydroelectric dam on the Banqiao river in China in 1975 caused around 230,000 deaths (McCully, 1998: Chapter 4; Yi, 1998).

Despite the shocking figures associated with non-nuclear energy catastrophes, the world does not commemorate them. Instead, year after year, it does so for the many times less deadly Chernobyl (Jaworowski, 2010). The evidence overwhelmingly suggests that, for generating large amounts of electricity, nuclear energy is the safest currently available option (Goldstein, 2011), yet it continues to be the single most controversial and feared modern industrial project, both in China and elsewhere.

## Fear that Kills

The key to understanding the paranoia surrounding nuclear energy is radiophobia – the widespread irrational fear of radiation that has dominated the debates on nuclear energy (Jaworowski, 2010). Paradoxically, this fear is perhaps the single greatest threat to human lives

and well-being posed by the nuclear industry.

While there have been relatively few deaths as a direct result of radiation exposure due to nuclear accidents, the social, economic and public health effects of those incidents have been tremendous (Jaworowski, 2010). This is largely due to the direct impact of such fear on health, and the indirect consequences of various panic-driven measures undertaken in response to the incidents. In the case of Chernobyl, the WHO concluded that the mental health impact of the disaster has been by far 'the largest public health problem created by the accident' (WHO et al., 2005).

Evacuation and other measures undertaken by the USSR and other countries in the wake of nuclear-related accidents have led to high incidences of psychosomatic illnesses manifested as digestive or cardiac diseases (Jaworowski, 2010). Such measures have also been associated with other post-traumatic stress disorders and behaviours, such as sleep disturbance, obesity, headache, depression, anxiety, alcoholism, drug abuse and suicide (UNSCEAR, 2011; Jaworowski, 2010; Browne, 2002; Yamashita, 2011). With time, it is likely that similar health issues will be seen in those affected by the radiophobia unleashed by the Fukushima disaster (Yamashita, 2011).

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## Conclusion

The Wenzhou train crash of 23 July was a truly tragic event and it should certainly be carefully studied in order for China's railways to avoid such accidents in the future. However, there is a paucity of evidence supporting the popular belief that the crash points to systemic weaknesses in the way China manages and operates its infrastructure projects. In fact, following the problems in Fukushima, China ordered a safety review of all existing nuclear reactors and reactors under construction. Four months later, the authorities declared that their nuclear plants are safe and that they would continue developing nuclear power (Bradsher, 2011).

What the discussion suggests is that the narrative has been largely driven by anti-nuclear sentiments based on unfounded presuppositions and irrational fear, rather than any firm foundation in fact. If there is any crucial lesson to be learned from major industrial and energy-related accidents, it is that nuclear power is the safest currently available practical method for generating mass amounts of electricity. Far from being a non-traditional security threat to China, it should be embraced together with such projects as high-speed rail as a solution to such human security concerns as environmental degradation or poverty.

Yet, as the Wenzhou crash demonstrated, a major accident in a complex and prestigious industrial sector can create a powerful (if unjustified) outcry that can ultimately prove to be too great to ignore. The biggest challenge ahead of China in successfully pursuing these projects lies in building confidence in the face of the biases and fears existing both within and without its borders. Admittedly, a political system inherently hostile to transparency and openness might find this task difficult, if not impossible.

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**About the Centre:**

The Centre for Non-Traditional Security (NTS) Studies of the S. Rajaratnam School of International Studies was inaugurated by the Association of Southeast Asian Nations (ASEAN) Secretary-General Dr Surin Pitsuwan in May 2008. The Centre maintains research in the fields of Food Security, Climate Change, Energy Security, Health Security as well as Internal and Cross-Border Conflict. It produces policy-relevant analyses aimed at furthering awareness and building capacity to address NTS issues and challenges in the Asia-Pacific region and beyond. The Centre also provides a platform for scholars and policymakers within and outside Asia to discuss and analyse NTS issues in the region.

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