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Can Graphic Design Cost Lives?

Introduction

On March 27, 1977, a small design error contributed to the deadliest aviation disaster in history in Tenerife. Two Boeing 747s collided on the runway, killing 583 people. While human error and communication failures played a role, inadequate runway markings and signage contributed to the confusion in the limited space, which has a sobering effect: poor design can cost lives (FAA, 2023).

Victor Papanek, a pioneer of ethical design, once noted, “In an age of mass development, when everything must be planned and formulated, design has become the most powerful means by which man creates new tools, changes the environment, and, as an ideology, changes society and himself. This imposes on the designer a serious social and moral responsibility” (Papanek, 1984, p. 9). This statement officially places great responsibility on designers, decisions that may involve not only the perception of information but also ongoing actions where lives are at stake.

If a simple visual system can prevent a catastrophe, why do we so often underestimate the vital potential of graphic design? How many tragedies could have been avoided if designers had prioritized clarity and usability? These questions force us to reconsider the innovativeness of design solutions and their impact on the world around us. Graphic design is not only creative; it is a tool that lives depend on.

In this case, we will look at three key areas where graphic design plays a crucial role: visual materials for aviation security, pharmaceutical packaging, and waste management systems. These examples demonstrate the effectiveness of thoughtful design, that it is not only desirable but also vital. After all, it has learned not only to save lives but also to take them.

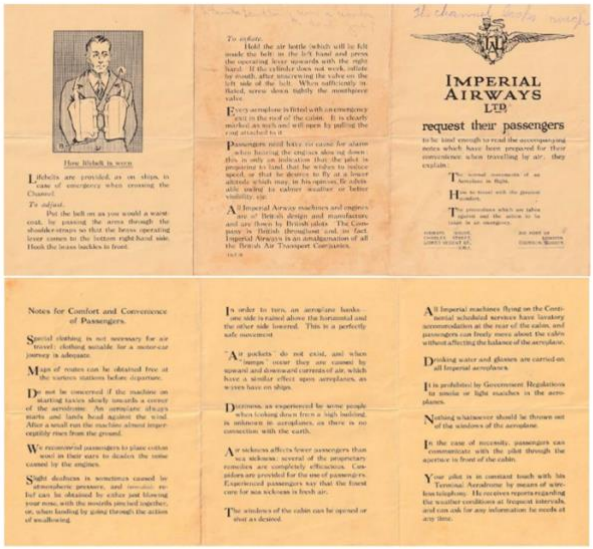
Chapter 1: Aviation Safety and Visual Design

On March 27, 1977, two Boeing 747s collided on the runway at Los Rodeos Airport in Tenerife, killing 583 people. The crash remains the deadliest in aviation history. While human error and poor communication between pilots and air traffic control were key factors, poor design also played a significant role. The airport's runway markings and signage did not provide clarity in the low visibility conditions caused by dense fog. This inadequate visual infrastructure forced pilots to rely solely on verbal instructions, increasing the likelihood of fatal interpretation errors (FAA, 2023).

Don Norman (1988, p. 129-130) argued that "The real culprit, almost always, is the design. Design that makes it easy to make wrong settings, or to misread an instrument, or to misclassify an event." The Tenerife disaster is an example of this principle. Subsequent action was taken to change the taxiway markings (U.S. Department of Transportation, Federal Aviation Administration, 2024, p. 43).

Continuing with the aviation theme, another important area where graphic design impacts safety is in-flight safety brochures. These materials are often the only source of guidance for passengers in emergency situations. Passengers' effectiveness depends on their ability to quickly and clearly convey complex instructions, even to those who may not speak the airline's language. As Edward Tufte, a leading authority on information design, said, "Graphic excellence is that which gives the viewer the greatest number of ideas in the shortest time with the least amount of ink in the smallest space" (Tufte, 1983, p. 51). However, in the early 20th century, safety cards consisted primarily of text with little or no visual aids. According to *The History of Safety Cards: Part One* (WAHS, 2023), early

attempts at in-flight safety materials often overwhelmed passengers with lengthy written instructions that were impractical in emergency situations (see Fig. 1 and Fig. 2).



Imperial Airways – probably 1930

KLM 1934

Figure 1. Safety instruction leaflet from Imperial Airways, circa 1930. Source: WAHSONLINE (2024).

Figure 2. KLM safety instruction leaflet, 1934. Source: WAHSONLINE (2024).

By the 1960s, following the direction of the International Civil Aviation Organization (ICAO), airlines began to standardise safety instructions. However, even these efforts initially relied heavily on text, and the included illustrations lacked clarity and universality (see Fig. 3).

Figure 3. Braniff International Boeing 727 safety card, safety instructions from the 1960s. Source: WAHSONLINE (2024).

Modern safety cards, by contrast, embody Tufte's principles of graphic excellence. Airlines now use clean, minimalist designs that focus on visual storytelling. For example, Ryanair's brochures use universally recognizable icons, colour elements, and consistent illustrations to guide passengers through evacuation procedures. They have also replaced printed brochures with a sticker on the seat in front of the passenger, which I find more convenient and increases the chance that the person will look at it (see Fig. 4). In my experience, I sat there staring at the sticker out of boredom, when last time I didn't even want to take it out of my seat pocket. This illustrated approach removes language barriers and ensures that passengers of all backgrounds and nationalities can understand important safety information.

Figure 4. Modern Ryanair safety card integrated into the seat-back design. Source: KCM for Economy Class and Beyond (2016)

In addition to paper materials, digital advances have further improved safety communications. Airlines like Air New Zealand and Emirates have replaced traditional brochures with video demonstrations. These visually engaging videos use dynamic graphics and sound effects to grab attention and convey information more effectively than static images. For example, in 2014, the company produced a very funny Lord of the Rings-themed safety video starring Elijah Wood, combining entertainment with safety guidelines (*Air New Zealand*, 2014). When looking at these examples, it is important to recognize the evolution of graphic design from a supporting role to a central safety tool. The shift from text-heavy brochures to visually driven materials reflects a growing understanding of human behaviour under stress. Modern safety materials aim to minimize cognitive load, ensuring that passengers can quickly process and follow life-saving instructions (Krug, 2006). This transformation illustrates how graphic design, when done thoughtfully, serves as a silent sentinel, protecting lives in times of crisis.

Chapter 2: Pharmaceutical Packaging and Human Health

Medication packaging is a critical interface between healthcare providers and patients. However, poorly designed packaging has contributed to numerous medication errors, some with tragic consequences. According to a study analysing the first 4,000 incident reports in the anaesthesia incident reporting system webAIRS, 462 incidents involved medication errors caused by incorrect dosages or substitutions, with similar packaging identified as a significant contributing factor (Kim et al. 2022). When medications with completely different purposes have strikingly similar designs, even highly trained professionals are at risk of making fatal errors.

One of the most striking examples of medication errors involving similar-looking drugs involves neuromuscular blocking agents, which have been repeatedly misprescribed due to packaging that is indistinguishable from the anaesthetic lidocaine (see Fig. 5). American Patient Safety Foundation (APSF) highlights that inconsistent colour coding and similar bottle shapes often lead to these errors (APSF, 2022). Such cases demonstrate the life-threatening consequences of poor design and highlight the critical need for clarity and differentiation in pharmaceutical packaging.

Neostigmine, Lidocaine

Figure 5. Look-alike medication vials: Neostigmine and Lidocaine, Source: APSF (2024).

My personal experience confirms these concerns. While working as a cosmetic dermatologist in 2020, I almost administered the wrong product to a patient because two packages from the same manufacturer were visually difficult to distinguish. Both fillers from Croma had identical typography and similar label designs. Even though the packaging design had distinctive visual signs in the form of circles symbolizing the density of the drug, this was not enough for my brain to quickly process the differentiation information (see Fig. 6). Although a last-minute double-check prevented a serious error, this incident underscored the importance of user-centered design in preventing errors. In comparison, a product from another company Belotero that was colour-coded never made me wonder if I was using the right product (see Fig. 7). Steve Jobs famously stated, “Design is not just what it looks like and feels like. Design is how it works” (Steve Jobs, n.d.). Thoughtful graphic design is not just about aesthetics; it is about ensuring safety, clarity, and accountability.

Figure 6. Saypha hyaluronic dermal filler packaging, highlighting the Look-Alike design. Source: Croma (n.d.).

Figure 7. Belotero dermal filler packaging, featuring bold colors and product-specific differentiation for easy identification. Source: Merz (n.d.).

Fortunately, the pharmaceutical industry is starting to address these issues. In 2020, CanonPharma won a gold award at the international Pentawards packaging design competition for its innovative packaging redesign. The updated design uses bold, clear typography to differentiate products, a robust colour-coding system to differentiate dosages, and streamlined layouts that direct attention to important details. (see Fig. 8) The design company explains that they have assigned a colour to each pharmacological group (e.g., red for cardiology), and within the groups, they have systematized lists of all drugs. The first digit corresponds to the drug number in the pharmacological group, and the second digit after the period - to the dosage (see Fig. 9). Thus, when coming to the pharmacy, the patient can name only his group and number. The medical design system is built on the contrast of hard and soft forms; they reflect the idea of combining advanced technologies and care for the consumer. The design of the numbers themselves is based on the shape of the tablets. (Repina

Branding, 2020) All of these changes reflect user-centred design principles, ensuring that healthcare providers can quickly and accurately identify medications even in complex situations.

Figure 8. CanonPharma packaging redesign. Source: Repina Branding (2020).

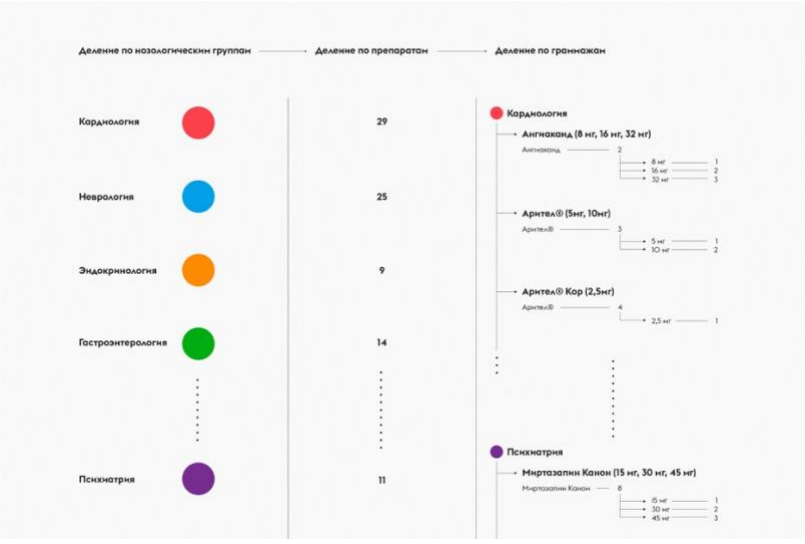


Figure 9. Detailed visualization of the CanonPharma numeric system for categorizing drugs by pharmacological groups and dosage. Source: Repina Branding (2020).

Clear branding also plays a crucial role in building trust. Professionally designed packaging instils confidence in patients, especially in the fight against counterfeit drugs. As highlighted in the Repina Branding study at CanonPharma, good design not only prevents errors but also improves the patient experience, building trust in the healthcare system.

Victor Papanek's assertion that designers have a moral responsibility for the impact of their creations is especially relevant in healthcare. A poorly chosen font or an ambiguous colour scheme can have devastating consequences, while a well-executed design can save lives. Designers working on drug packaging must prioritize usability, accessibility, and clarity. As we enter the age of digital innovation, the opportunities to improve drug safety through design continue to grow. New technologies such as augmented reality overlays, QR codes linked to educational videos, and AI-powered error detection systems promise to make packaging even more intuitive and effective. Ultimately, the goal of design remains the same: to communicate information clearly and effectively while ensuring the safety and well-being of all users.

Chapter 3: Environmental Sustainability and Recycling Labels

Another area where graphic design has a profound impact on life and safety is environmental sustainability, specifically how packaging is labelled for recycling. Packaging design directly impacts how consumers perceive, use, and dispose of materials. However, poor design, ambiguous symbols, unclear instructions or inconsistent standards often lead to confusion, leading to improper disposal and ultimately harm to the environment. While the connection to

human life may not be as direct as in aviation or healthcare, its implications are nonetheless significant and far-reaching.

According to a 2024 report by BCC Research, misinterpreted labels contribute to 20% of consumer waste, amounting to a significant $29 billion in the U.S. Due to confusion over date labels, the average household throws away $275 to 455 worth of good food each year. Unclear packaging labels contribute to widespread confusion among consumers trying to recycle. For example, materials that could be recycled are often sent to landfills simply because their packaging does not effectively convey the necessary information. The report also highlights that improperly sorted recycling contaminates entire batches of recyclable material, rendering them unusable. Not only does this waste valuable resources, but it also increases pollution and worsens the global waste crisis.

Figure 10. Plastic waste highlighting the impact of poor design in driving the "take-make-waste" economy. Source: What Design Can Do (n.d.).

The downside of this confusion extends beyond environmental degradation. Microplastics from improperly disposed materials enter water supplies and food chains, posing significant risks to human health. Research has linked microplastics to increased cancer risk, hormonal disruption, and other health problems (Liu et al., 2024). Here again, graphic design is a critical tool for change. Effective packaging design can guide consumers toward appropriate recycling behaviour, reducing both environmental and human risks. While many organizations have adopted standardized labelling systems that improve clarity and usability, the question remains (U.S. Department of Commerce, 2023). These efforts reflect the power of graphic design to influence behaviour on a global scale, making sustainability more accessible to the average person.

The choice to use an undefined recycling symbol or unclear labelling may seem trivial in the studio, but it has cascading effects on ecosystems and human health. In this sense, designers are not just communicators, but stewards of sustainability, charged with creating systems that are intuitive, efficient, and effective.

The importance of these design principles will only grow as the world grapples with the environmental crises of the 21st century. The book Design for the Real World suggests that as designers, “with a sense of our social and moral responsibility, we must direct our energies to solve the problems of a world at a standstill while the clock invariably points to one minute to twelve” (Victor Papanek, 1984). Designers must think beyond aesthetics and marketing appeal, embracing their role as problem solvers and change agents. By prioritising clarity, usability and sustainability, they can ensure their work contributes to a healthier, safer future for all.

Conclusion

So, can graphic and information design cost lives? As this essay shows, the answer is a resounding yes. Graphic design is not just about creating something visually appealing; it is a critical tool that shapes how people interpret and act on information. Whether it was the unclear runway markings that contributed to the Tenerife disaster, the dangerously similar packaging of medications, or the ambiguous recycling labels that harm both the planet and human health, the consequences of poor design are undeniable and far-reaching.

The Tenerife tragedy highlights the enormous moral responsibility designers must ensure clarity and usability, especially in high-stakes environments where lives depend on their decisions. Similarly, in healthcare, poorly designed drug packaging has caused fatal errors that could have been prevented with thoughtful design. These lessons extend to environmental sustainability, where standardized and intuitive recycling labels guide consumers toward responsible behaviour, reducing long-term harm to both human health and the planet.

As designers, we have extraordinary power to influence behaviour, decisions, and ultimately outcomes. Every choice we make whether it's a font, a colour scheme, or the placement of a symbol can reverberate through systems that impact millions of lives. Poorly executed design creates confusion, perpetuates mistakes, and, in the most extreme cases, leads to tragedy. Conversely, thoughtful design empowers users, reduces risks, and saves lives.

As we reflect on these examples, the question is not just whether graphic and information design can cost lives—it certainly can—but how we, as designers, can ensure that our work protects lives instead. Graphic design has the potential to transform systems and lives. It is a discipline that must be approached with care, responsibility, and foresight. The next time you, as a designer, are faced with a decision whether it's designing a safety card for a plane,

creating a label for a medicine, or creating a recycling symbol think about the lives your work will touch. Will it communicate clearly, prevent confusion, and save lives? Or will it leave room for error and risk? The stakes are too high to leave these questions unanswered. As designers, we must rise to the challenge and ensure that our work makes the world not just more functional, but safer and better for everyone.

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