Rust & Research

Educational Booklet

UNIVERSITÉ DU LUXEMBOURG
C²DH LUXEMBOURG CENTRE FOR CONTEMPORARY AND DIGITAL HISTORY
HISTORESCH GESINN
Luxembourg National Research Fund

Why Belval?

Belval is a place where Luxembourg's transformation can be felt most vividly. Where university buildings, cafés and apartment blocks now stand, the country's largest integrated steelworks lay just a few decades ago. Back then, the plant was a popular destination for international visitors: Among them were Romanian dictator Nicolae Ceaușescu in 1972, Queen Elizabeth II in 1976, Pope John Paul II and Boris Yeltsin in 1985, Chinese President Li Xiannian in 1987 and Bill Clinton in 1989. All of them had to wear the white safety helmet bearing the large "A" logo of the company ARBED and were guided through the hot, noisy production halls of Belval.

With its three technologically advanced blast furnaces, which were built between 1965 and 1979, the Belval plant was a long-standing symbol of the important role that the steel industry played in Luxembourg's national identity. Since the late 19th century, a dense industrial landscape had developed in the south of the country, in an area that became known as the Minette region. The iron ore deposits found there shaped everyday life for generations.

Until the 1970s, the iron and steel industry employed around 30,000 people in Luxembourg, with nearly 7,000 of those working in Belval alone, and it accounted for around a third of the country's total economic output. However, after decades of recurring crises in the steel sector, this industrial era came to an end with the closure of the last blast furnace in 1997. Although the rolling mills in the eastern part of the site remain active, the former blast furnace area underwent a complete transformation in the following years. A modern urban district emerged around the preserved furnaces, complete with offices and housing. Since 2015, the district has also been home to the buildings of the University of Luxembourg.

Today, Belval once again serves as a regular destination for state visits — no longer as a site of steel production, but of knowledge. Distinguished guests such as French President François Hollande in 2015, German Presidents Joachim Gauck in 2014 and Frank-Walter Steinmeier in 2023, as well as Portuguese President Marcelo Rebelo de Sousa in 2017, have all admired the innovative transformation of the former industrial infrastructure into a vibrant university campus. Belval is a prime example of Luxembourg's broader transformation from an industrial nation built on steel to one increasingly driven by services, finance and a growing knowledge industry.

It is precisely this transformation, and the contrast between the past and the present, that we wanted to capture with this game. Our aim was to design a card game that would convey Belval's transformation from an industrial iron production site into a research and innovation hub in a fun and accessible way. Rust & Research aims to spark curiosity and share the historical background of this unique place while offering insights into life and work on the university campus today.

Who are we?

We are four doctoral researchers at the Centre for Contemporary and Digital History (C²DH). As historians and researchers at the University of Luxembourg, we share a deep interest in Belval's history as well as in the university life that now unfolds there. As industrial historians, Zoé and Nicolas focus in their research on the transformations of Luxembourg's steel industry and their social consequences since the 1970s. Joé and Masha, both historians and tour guides on the Belval site, bring a close connection to the area's history and architecture. The idea for the game emerged during a casual game night when we considered how history could be presented differently. Why not playfully? Why not through Belval, a place where change is so visible? What began as an abstract idea gradually evolved into a substantial project over the following two years.

How it all began

Rust & Research began in 2023 with the support of the C²DH Thinkering Grant, which is funded by the Fondation Lydie Schmit and promotes innovative forms of science communication and creative experimentation with digital and analogue methods. This initiative aims to find new ways of making history tangible, which is precisely what we set out to do with our project. In 2025, we received additional funding from the Fonds National de la Recherche (FNR) through the PSP grant, a programme dedicated to promoting public engagement with science. Following two years of creative work, in-depth research, numerous testing phases and collaboration with illustrators and game designers, Rust & Research became reality. Historical documents, archival material and photographs were transformed into a visually engaging card game designed to entertain and encourage reflection. In doing so, we simplified complex historical developments to make them more accessible without abandoning source criticism — the most essential tool of historical scholarship.

The story the game tells

The game unfolds across two different timelines. The first timeline takes players back to Belval's industrial past. Although the steelworks went through numerous phases of development after they were founded in 1911, Rust & Research primarily focuses on the years between 1970 and 2000 — a period of profound transformation for Belval and Luxembourg's steel industry. The second timeline reflects the present day, when Belval has become a modern knowledge hub. Here, the university landscape takes centre stage alongside the ongoing transformation that continues to shape the site.

The character cards bring this history to life, featuring characters such as steelworkers, engineers, students and researchers, all of whom are connected to Belval in different ways. These are complemented by ability cards that address broader themes such as economic and social history, urban development and the university's research landscape. Finally, the time-travellers link the two timelines, highlighting the ongoing transformation that still occurs today. In doing so, the game sheds light on aspects of social history that are often overlooked in public depictions of Belval's industrial heritage. Players are invited to experience Belval's transformation in greater social depth, offering a multifaceted view of its past and present.

Educational booklet

Rust & Research is more than just a game — it's also a learning tool. It encourages players to engage with history, ask questions and consider the evolution of work, society and education. This educational booklet is designed to explore the themes of the game in more depth. Each card is presented alongside a short explanatory text that places it in its historical context. Additionally, the booklet provides background information on key topics, explains historical developments and establishes links between the past and the present.The booklet is intended as a guide and source of inspiration for teachers, students and anyone interested in using the game for learning or workshop activities. A bibliography at the end offers suggestions for further reading for those who wish to explore Belval and its history in more depth, whether in the classroom or simply out of curiosity.

1. Character Cards

Student

Students are at the heart of every university. Around 7,000 students were enrolled at the University of Luxembourg in 2024, studying for Bachelor's and Master's degrees in subjects such as science, technology, law, economics and the humanities. Most of the University's faculties and facilities are located within Belval's Cité des Sciences, the modern campus built on the grounds of the former furnaces, while the faculties of Law and Economics are based in Luxembourg City. Students' days consist of lectures, seminars and project work, through which they earn ECTS credits and develop the knowledge and skills necessary for their future careers. Outside of the classroom, student life offers opportunities to join clubs and attend events. Taking part in an exchange program can also be an integral part of being a student. This gives students the chance to experience life at a different university while continuing their studies.

Apprentice

Apprentices are workers who are in the process of learning a profession under the guidance of more experienced colleagues. In the steel industry at Belval, most began as general laborers, called Hilfsarbeiter in German. They were assigned wherever extra hands were needed – in the rolling mill, the blast furnace area, or the workshops. This rotation gave them the chance to see different parts of the plant and understand how a large industrial site functioned on a daily basis. At Belval, apprenticeships were part of a broader training system within ARBED, ensuring a steady supply of skilled workers for Luxembourg's steel industry. At its peak in 1970, 6,758 people worked at the Belval site alone. Step by step, the apprentices learned to handle heavy machines safely, follow rules, and work as part of a team. As they gained experience, apprentices could take exams or formal training courses, opening the way to skilled positions with better pay and responsibilities. For many, this path marked the beginning of a lifelong career in the steel industry.

Goldfish

Goldfish can be found in the many ponds of Belval surrounding the University buildings. Their bright orange colour makes them stand out among water plants and gives the modern campus an unexpected splash of life. How they got there is still unclear: no one ever officially introduced them. Some believe they were released by local residents or students who no longer wanted to keep them in aquariums. Others think birds like ducks or herons may have carried the eggs from elsewhere. The fish have adapted to cold winters and hot summers, surviving in the ponds year after year, multiplying over time. The ponds themselves were part of the redevelopment plan by French landscape architect Michael Desvigne, designed to bring nature back into the former industrial landscape and soften the site's industrial brutalism. What began as a mystery has turned the goldfish into a familiar sight and a small but lively part of Belval's new environment.

Canary Bird

Canaries were life-saving companions to miners until the early 20th century. These small birds served as a simple but effective warning system against poisonous gases like methane, which could build up in coal mines. Because canaries are very sensitive to bad air, they would stop singing or show signs of distress if the gas levels got too high giving miners an early signal to evacuate before it was too late. To protect the birds, some of the canary-cages even had a reanimation mechanism that could pump oxygen into the cage, helping the bird recover if it was overcome by gas. This practice became so well known that "a canary in a coal mine" is still used today as a metaphor for any early warning system. In the iron ore mines of Luxembourg and Lorraine, methane was not a concern, so canaries were not needed. The main concern here was low oxygen levels rather than toxic gases. That's why miners used carbide lamps to monitor oxygen levels instead. If the flame went out, it meant that there was not enough oxygen in the air.

Guest Lecturer

Guest lecturers are people from other universities, research institutes, or workplaces who are invited to share their expertise. They often come from abroad, bringing new perspectives, ideas, and experiences into the classroom. Their lectures give students and professors the chance to learn about different research approaches, international expertise, and cultural backgrounds. Some guest lecturers stay for just a single talk, while others join for an entire semester or academic year. Their visit makes the university more international and creates links between people from different places. At Belval, where courses are taught in English, French, and German, guest lecturers reflect the University of Luxembourg's multilingual and international character.

Miner

Miners played a key role to Luxembourg's industrial rise at the end of the 19th century, working in the iron ore mines that supplied the emerging steel industry. They worked underground, extracting iron ore in difficult conditions with no daylight. The iron ore mines were located in the southern region of Luxembourg and extended into Lorraine, France. Although not located in Belval itself, these mines provided the iron ore that was later smelted into crude iron and converted into steel at the Belval steelworks. In 1970, Luxembourg's mines produced 5,7 million tonnes of iron ore – enough to fill around 912 Olympic-sized swimming pools. The Fond-de-Gras mine, the last iron ore mine in Luxembourg, closed in 1981. Afterwards, Belval's furnaces were supplied by mines located in France, or they used iron ore from further abroad, like Sweden or Brazil. Today, Fond-de-Gras operates as an open-air museum, preserving the memory of Luxembourg's mining heritage.

Data Scientist

Data Scientists play a crucial role in analyzing and leveraging data to support education and research at universities. Their responsibilities include collecting, processing, and interpreting large datasets, developing predictive models, and ensuring data-driven decision-making. Whether it's optimizing academic resources, analyzing research trends, or enhancing digital learning experiences, Data Scientists contribute to innovation by transforming raw data into valuable insights, helping the university operate more efficiently in an increasingly data-driven world.

Chef de Gare

The Chef de Gare at Belval-Usines station ensured that the steelworks ran smoothly. He was responsible for all railway operations serving the plant, from passenger trains to freight wagons. Every day, thousands of workers from surrounding villages such as Belvaux, Soleuvre and Esch/Alzette arrived by train for their shifts, and the Chef de Gare made sure they reached the plant on time and got home afterward. He also organized timetables, coordinated the loading and unloading of materials, and kept trains moving in and out of the steelworks efficiently. The station was also the link between the plant and the rest of Luxembourg, as well as cross-border connections to France and Belgium. Without the Chef de Gare keeping people and goods on schedule, the entire production process at Belval would have been at risk of delays and disruptions. In 2010, the former Belval-Usines station was renamed Belval-Université, with Luxembourg's only elevated train station being built on top of the original tracks.

Student Representative

The student representative plays a crucial role in bridging the gap between the student body and university administration. Elected by their peers, they advocate for student concerns, help shape policies, and ensure that student voices are heard in key decisions, contributing to a more inclusive and responsive academic environment. Their responsibilities include attending meetings with faculty and administrative officials, voicing collective issues raised by students, and participating in committees that decide on matters such as curriculum changes, campus facilities, and student welfare. Beyond formal meetings, student representatives also gather feedback, mediate conflicts, and promote initiatives that enhance student life, ensuring that the interests of their peers are always at the forefront of university planning.

Trade Unionist

Trade unionists have long been important voices for steelworkers in Luxembourg. The first free trade unions were founded in 1916 in Luxembourg, when workers in the south of the country organized to defend their rights. The largest trade unions in Luxembourg today are the OGBL (Onofhängege Gewerkschaftsbond Lëtzebuerg) and the LCGB (Lëtzebuerger Chrëschtleche Gewerkschaftsbond). The OGBL is the largest trade union in Luxembourg and tends to support social and workers' rights causes, while the LCGB has Christian-social roots and is particularly strong in the private services sector. In the steelworks, especially in Belval, union representatives were elected by their colleagues to speak on behalf of the workforce. They negotiated with management about wages, working hours, and safety standards, ensuring fair treatment for workers. Their struggles also shaped today's working conditions in Luxembourg: in 1970, a law gradually reduced the workweek from 48 to 40 hours by 1975, and in 1975 a fifth week of paid holiday were introduced.

Doctoral Researcher

Doctoral researchers are members of the University who carry out research while also pursuing a Ph.D. degree. As of 2024, about 1,000 doctoral researchers at the University of Luxembourg are enrolled across a wide range of disciplines. Their work often combines research with teaching: many assist in Bachelor's and Master's courses while developing their own dissertation projects. They take part in seminars, present at conferences, and publish academic papers. Doctoral researchers must also complete key milestones such as progress reviews, dissertation writing, and the final thesis defense.

Furnaceman

The furnaceman, known in Luxembourgish as Feierstëppler, was a specific type of steelworker who was responsible for overseeing the smelting of iron in traditional blast furnace steel plants. He carefully monitored temperatures, adjusted fuel inputs, and ensured the continuous flow of molten iron from the furnace to the casting area. In addition, he maintained the furnace, ensuring that the walls were strong and capable of handling the extreme temperatures. Any misjudgment in temperature or timing could lead to production disruptions. The furnace man was often a highly experienced worker, whose job was physically demanding and required a deep understanding of the smelting process.

Librarian

Librarians play a vital role in supporting academic research and student learning. Librarians manage vast collections of books, digital resources, and research databases, while also assisting students and faculty in navigating information. Modern libraries are not just about books – they also offer scanners, digital research tools, and collaborative spaces equipped with screens where students can work together on projects. In Belval, they work in the Luxembourg Learning Centre, a library housed in the former Möllerei since 2018, once used to store iron ore and coke. With around 1,000 study places, the centre is one of the largest libraries in Luxembourg and a key meeting and study place for students and researchers.

Foreman

Foremen were workers in the steel industry who had a supervisory role on the shop floor, typically with employee status. They were responsible for coordinating the daily work in the plant and making sure production ran smoothly. A foreman assigned tasks to the workers, solved technical problems, and ensured that safety rules were followed. Because they worked closely with both the management and the workforce, they acted as a bridge between the two sides. Training new workers was also part of their job: foremen showed recruits how to handle machines properly and how to work safely. In Belval's ARBED site, foremen were key figures during the industrial peak of the 1960s and 1970s, when thousands of workers operated in three-shift systems around the clock. Their experience often made them indispensable mediators in both technical and social matters on the shop floor.

Professor

Professors are university teachers and researchers who lead academic work in their fields. At the University of Luxembourg, around 300 professors and senior lecturers were employed in 2024. They teach courses, supervise Bachelor's and Master's students, and help design academic programmes. At the same time, they conduct research that contributes to new knowledge in different fields. Professors also mentor young researchers, guide dissertation projects, and represent the university at conferences. Beyond the campus, their expertise often informs public debate: professors advise policymakers, work with industry partners, and help apply research findings to real-world problems. In this way, they connect academic knowledge with broader social and economic challenges.

Engineer

Engineers in the steel industry play a crucial role in designing, improving, and maintaining the processes that turn raw materials into finished steel. They oversee the technical aspects of production, ensuring that machinery operates efficiently and safely. From optimizing blast furnace operations to developing new methods for smelting and refining, engineers are at the forefront of innovation in the steel industry. While this role was mostly filled by men, Vlasta Tomaskova stood out as the first female engineer in Belval. Originally from the Czech Republic, she arrived in Luxembourg in 1974 and later becoming an important figure at the Research Centre in Belval.

Rector

The Rector is the highest academic and administrative leader of a university. At the University of Luxembourg, the Rector is responsible for setting the strategic direction of the entire university. This includes academic policy, research priorities, and the development of international partnerships. The Rector also oversees the creation of new study programmes, supports research initiatives, and ensures that the university keeps pace with global academic standards. Acting as the public face of the institution, the Rector represents the university in both national and international contexts, building connections with governments, research networks, and other universities. Through this role, the Rector shapes the long-term growth, reputation, and academic mission of the University of Luxembourg.

Steel Company Director

Steel company directors were the top managers of Luxembourg's largest industrial enterprise, ARBED, and among the most influential figures in the country's economy. As heads of the company, they decided on production levels, investments, and long-term strategies for the steel industry. Balancing economic growth, technological modernization, and labor relations was part of their daily work. Some directors became well-known national figures, such as Émile Mayrisch, who expanded ARBED internationally in the early 20th century, or Emmanuel Tesch and Joseph Kinsch, who led the company through the challenges of the steel crisis in the 1970s and beyond. Their decisions shaped not only the future of the steel industry but also Luxembourg's broader economic development, as ARBED remained the country's largest employer and exporter for decades.

2. Zeitreisen-Karten

Train 2 – Sheet Piles

Even though the Belval site has been fundamentally transformed over the past 30 years, steel production remains a key activity on site. One of Belval's two rolling mills has been producing sheet piles since the steelworks opened in 1911, adapting to demands through modernisation over the decades. Sheet piles, long steel sections with interlocking edges, are crucial in construction projects, forming walls that support excavations, prevent soil erosion, and create barriers for water or soil. These versatile products are essential for retaining walls, flood defenses, and bridge foundations. Even today, sheet piles from Belval are exported around the world, showing that the site's industrial importance endures.

Blast Furnace A

Blast Furnace A was built in Belval in 1965 to replace the six older blast furnaces that stood in Belval since the early 1900s. It could produce 2,100 tons of crude iron a day, making it an important asset of Luxembourg's steel industry. During the 1970s, however, production was reduced, and Blast Furnace A was shut down in 1986. After that, it was only used as a backup when its sister furnaces B and C needed repairs. In 1995, the furnace was donated to the state and became a national monument in 2000. Today, it stands at the center of the "Blast Furnace Terrace" in Belval and together with Furnace B, it forms one of Luxembourg's most significant industrial heritage sites. Visitors can climb it for a great view of modern Belval and its surroundings.

Gebléishal

The Gebléishal was built in 1910 and originally played a crucial role in crude iron production, generating the wind that was blown into the blast furnaces to heat the iron and converting the waste gases of the furnaces into electricity, which could be reused throughout the site. Since the closure of the site, the Gebléishal has yet to be given a new purpose in the redeveloped Belval district. In 2007, it was used as a part of an exhibition on sustainability during the city of Luxembourg's year as the European Capital of Culture. The iconic phrase "All We Need" was painted on the building during this time. Still filled with remnants of machinery, it has also briefly been used as a site for police confiscated cars, while a series of conferences called (H)All We Need" has debated its potential reuse.

Möllerei

The Möllerei building in Belval was built in 1910. Until the closures of the last blast furnace in 1998, it was used to crush and shred iron ore and coke, as well as to store these essential raw materials before they were hoisted up to the nearby blast furnaces. Renovated and reimagined under the guise of Luxembourgish-Italian architect François Valentiny, the two thirds of the Möllerei was inaugurated in 2018 as the Luxembourg Learning Center, now home to the University of Luxembourg's library. The new space preserves elements of the original architecture and some of the machinery. Today, the Luxembourg Learning Center offers around 1,000 working places and serves as a space for students and the community in Belval, while the remaining part of the Möllerei serves as a vistor's centre and an exhibition space.

3. Ability Cards

Trente Glorieuses

"Trente Glorieuses" is a term widely used across Western Europe to describe the economic boom that lasted from 1945 to 1975. It was first used by French economist Jean Fourastié in 1979 to describe France's post-war history. During these thirty years, large parts of Europe experienced unprecedented economic growth, fuelled by post-war reconstruction, rapid industrialization, technological advances and a general rise in the standard of living. In Luxembourg and Belval, the steel industry flourished during this period, leading to a massive increase in steel production and industrial employment, with unemployment rates remaining remarkably low. The period came to an end with the oil crises of 1973 and 1979, which triggered economic stagnation, rising unemployment, and the beginning of a broader process of industrial restructuring across Europe.

Sale of Blast Furnace C

In 1996, Blast Furnace C from Belval was dismantled by 300 chinese workers and engineers from the Kunming Iron and Steel Group. The team, housed in temporary accomodation near Esch-Belval completed the dismantling within nine months. In December 1996, the parts were shipped from the port of Antwerp to China, arriving in early 1997 at the Kunming plant in Yunnan Province in Southwestern China. Renamed "Blast Furnace Number 6", it was reassembled and operational by September 1998, gaining a similar iconic reputation among Chinese steelworkers, who cherished it as a symbol of pride and industrial growth. This transfer gave Chinese engineers access to modern European steelmaking technology and contributed to the rapid expansion of China's steel production capacities in the 1990s, at a time when the country was on the verge of becoming the world's largest steel producer. In 2021, the former blast furnace C was also closed down in China.

Thinkering

"Thinkering"—a fusion of "tinkering" and "thinking"—captures the spirit of creative experimentation with digital and technological tools to interpret and present history in new ways. At the C²DH (Centre for Contemporary and Digital History), this approach is central to exploring fresh historical insights and crafting innovative narratives. The game you are holding in your hands is a direct product of thinkering. A playful attempt to bring history to a wider audience, it blends historical research with interactive storytelling. We aim to make history engaging, accessible, and immersive. This game is not just entertainment—it's a new way to experience the past.

Modernization

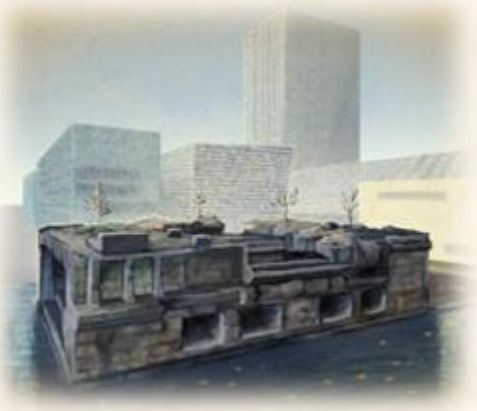
In the 1950s and 1960s, the Belval steel plant underwent major modernization to keep up with the growing demands of the steel industry. The six blast furnaces dating back to 1911 were gradually replaced by blast furnace A in 1965 and blast furnace B in 1970, featuring advanced technologies and larger capacities in an effort to centralise all of the crude steel production in Belval. At its peak in 1974, 1.78 million tonnes of steel were produced in Belval, equivalent to roughly 45,000 loaded trucks. While four blast furnaces were originally planned, the state-of-the-art Blast Furnace C, completed in 1979, marked the culmination of this modernization phase. However, despite significant investments, Luxembourg lagged behind other CECA countries in modernization during this period, hinting at the challenges the steel industry would face in the coming decades.

Deadline

Deadlines are an unavoidable part of student life. They shape the everyday routine of students, determining when assignments are due, when exams are approaching, and when all-nighters become inevitable. The term "deadline" originally referred to a line in a prison that, if crossed, would lead to serious consequences. Missing a deadline can lead to last-minute panic, frantic typing, and sometimes the infamous "I swear my computer crashed" excuse. But for those who master the art of scheduling, deadlines can also be motivating—a reminder that maybe it's time to get things done. After all, nothing sparks creativity like a deadline looming just hours away. At the University of Luxembourg, semesters begin in mid-September and mid-February, with exam periods in January and June; dates that every student soon learns to plan their life around.

Industrial Remains

Although the Belval site has undergone significant transformation in recent decades, a number of industrial remains are still visible today. One example is the foundation of blast furnace C, which once supported the tallest and most modern of Belval's three blast furnaces. This furnace was sold and dismantled in 1996, and was subsequently reassembled in China. During Esch's tenure as a European Capital of Culture in 2022, the site hosted cultural events such as art performances and exhibitions. The nearby university canteen's architecture mirrors the foundation's design, subtly linking the site's industrial past to its modern transformation.



Master Plan

A master plan is a strategic document that provides a framework for the long-term development of a specific area, detailing how land, infrastructure, and buildings are organized. For Belval, the master plan was designed by the Dutch architecture firm Jo Coenen & Co in the early 2000s to guide the redevelopment of the former industrial site into an urban district. It combined the preservation of industrial heritage, such as the blast furnaces, with the integration of new urban functions, including residential, cultural, and educational areas. Central to the plan was the "Cité des Sciences", which houses the University of Luxembourg, while other parts of the site were also opened to private real estate investment. While the plan has been adapted over the years to meet evolving needs, its core vision and structure have largely remained consistent.

Crisis Division

The Crisis Division was established in 1975 as a response to the steel crisis to address the social challenges caused by industrial restructuring and to avoid large-scale unemployment in Luxembourg. One key measure introduced was the «Notstandsarbeiten» - emergency public works that provided temporary employment for redundant steelworkers. These workers, numbering around 1,200 in 1975, were employed in projects such as clearing rivers and forest paths, maintaining roads, and restoring natural landscapes while retaining their steelworker salaries. As a result, Luxembourg managed to prevent significant unemployment during the restructuring of its steel industry. The division formed part of Luxembourg's emerging "Tripartite" model, in which government, employers, and trade unions cooperated to manage the crisis. Its measures helped maintain social stability and became a reference for later economic adjustment policies.

Electric Arc Furnace

In 1997, the steelworks in Belval replaced their traditional Blast Furnace with an Electric Arc Furnace (EAF), marking a big change in how steel was made. Unlike the Blast Furnace, which relies on coke and iron ore, the EAF melts scrap metal using an electrical current. Powerful electrodes create arcs of electricity, generating extreme heat to recycle scrap materials such as for example old cars and household appliances and transform it into liquid steel. Operating an Electric Arc Furnace is an energy-intensive process. A single furnace typically uses as new EAF is to be commissioned in Belval in 2025, which will also supply crude steel to the Rodange site.

Proximity Suit

In the steel industry, proximity suits are crucial for protecting workers, such as furnace men, from the intense heat generated during steel production. When molten iron pours out of the blast furnace, it can reach temperatures of up to 1,500°C. Proximity suits are designed with multiple layers of heat-resistant material, often aluminized, to reflect radiant heat and prevent burns. In Belval, these suits allowed workers to safely approach the furnace, ensuring they can carry out their essential tasks without risking severe injury. Introduced widely from the 1960s onward, they marked a new era of industrial safety and professionalization in steel industry.

Papal Blessing

Pope John Paul II's visit to Luxembourg in 1985 was a significant event that captured the nation's attention. Among the notable moments was his visit to the Belval steelworks, where he delivered a sermon in front of the steel plant. During the visit on May 15th, the Pope had to wear a hard hat because even divine intervention doesn't exempt you from health and safety regulations. While the crowds in Luxembourg City were overwhelming, the number of spectators in Esch-sur-Alzette was described as rather modest. Today, a monument commemorating the Pope's visit stands on Boulevard Charles de Gaulle in Esch.

Group Assignment

Group assignments are an essential part of university life, helping students develop teamwork, communication, and problem-solving skills. In group assignments, students collaborate to research topics, analyze information, and present their findings. Working in a group encourages critical thinking, teaches how to manage different perspectives, and prepares students for real-world professional environments where teamwork is key. Beyond academic learning, group assignments also help to build connections and learn from each other's strengths.

Research Patent

A research patent is a legal protection granted to an invention, ensuring that the rights to commercially exploit the innovation belong exclusively to the patent holder for a specific period—typically 20 years. In academic institutions like the University of Luxembourg, patents play a crucial role in bridging the gap between scientific discovery and real-world applications. The University of Luxembourg's most recent patents include smart sensor technologies and processes to improve the safety of autonomous vehicles, developed in Belval

Innovation Drive

The steel crisis of the mid-1970s forced Luxembourg's steel industry to modernize in response to growing global competition and declining demand. Blast Furnace C, built in Belval between 1977 and 1979, became a symbol of this period of transformation. As one of the most advanced in the world at the time, it featured full computerization for process control and an innovative cooling system with over 2,000 integrated water-cooled plates. This innovation drive aimed to stabilize the struggling industry, but by the 1990s, even Blast Furnace C became redundant as the challenges of overcapacity and global shifts in steel production persisted.

Exchange Program

An exchange program allows students and academics to spend time at a partner institution abroad, experiencing different academic and cultural settings. At the University of Luxembourg, exchange opportunities include the Erasmus+ program within Europe and collaborations with universities worldwide. These programs facilitate study, teaching, or research while encouraging language skills and cross-cultural learning. All Bachelor's students at the University of Luxembourg are required to spend a semester abroad—most of them through the Erasmus+ network at partner universities across Europe.

Hidden Reserves

The iron ore deposits in southern Luxembourg, known as "Minette", have long been a defining feature of the region. Concentrated around Esch-sur-Alzette, Differdange, and Dudelange on the Luxembourg side of the border, these deposits gave rise to Luxembourg's industrial heartland. Though the ore's high phosphorus content initially limited its usefulness, the introduction of the Thomas-Gilchrist process in 1879 transformed its value by enabling the removal of phosphorus during steel production. This process not only boosted the steel industry in the south but also created a byproduct—fertilizer—that supported agricultural development in northern Luxembourg. However, in the second half of the 20th century, these iron ore reserves became less attractive due to the depletion of easily accessible deposits and competition from higher-grade ores in other regions of the world.

Tripartite

The tripartite system in Luxembourg emerged during the hard times of the steel crisis as a platform for dialogue between the government, employers, and trade unions, aimed at addressing economic challenges, protecting jobs, and maintaining social peace. Institutionalized in 1977, it became central to the Luxembourg model, which relies on consensus among social partners to overcome economic crises. For the steel industry, the tripartite played a crucial role in helping to maintain unemployment low by introducing anticrisis divisions and modernizing production facilities, particularly in Belval, ensuring the industry's long-term survival. At the same time, the tripartite agreement represented a shift in power from parliament, which no longer had a vote on crisis mechanisms, to the ARBED and the trade unions, which now had a direct seat at the political decision-making table. The system became a hallmark of Luxembourg's economic and social policy, later extending beyond the steel sector to shape national crisis management and welfare negotiations.

Workers' demonstration

Throughout history, workers in the steel industry have repeatedly used demonstrations to draw attention to abuses in their working environment and demand more rights for themselves. Due to the large industrial workforce in Luxembourg, these demonstrations and strikes also had a lasting impact on the country's entire social landscape, which is still visible today. The largest demonstration in Luxembourg's post-war history took place on October 9, 1973: thousands of workers from across the country took part in a general strike organized by the Lëtzebuerger Arbechter-Verband (a predecessor of today's OGB-L). Around 3,500 workers from the Belval steelworks took part. The strike led to improvements in working conditions. One important result was the reduction of the working week from 48 to 40 hours – a regulation that still exists today.

Research Award

Research Awards are used to recognize important work done by researchers. These awards are usually given to significant academic or scientific discoveries, new research approaches, or good scientific practice. Together with the National Research Fund (FNR), the University of Luxembourg hands out several research awards every year such as for example the Outstanding PhD Thesis, Outstanding Scientific Achievement, Outstanding Promotion of Science to the Public, and Outstanding Mentor award. Recent awards have honored research on topics ranging from cybersecurity and biomedical imaging to climate data analysis.

4. Bibliography

ArcelorMittal, La sidérurgie luxembourgeoise: un siècle d'histoire et d'innovation = Steelmaking in Luxembourg : a century of history and innovation (Luxembourg: Saint Paul 2011).

Archives nationales, Feierrout - le dernier siècle de la sidérurgie luxembourgeoise (Luxembourg: Archives nationales 2011).

Nicolas Arendt, Zoe Konsbruck, Stefan Krebs, „Zwischen Stahlkrise und Boom. Hochofen C von Belval ins chinesische Anning". In: *Tageblatt Nr. 171* (2025), 6–7.

Charles Barthel, Josée Kirps, Archives nationales, Centre d'études et de recherches européennes Robert Schuman, Terres rouges - histoire de la sidérurgie luxembourgeoise: volume 1-7 (Luxembourg: Centre d'études et de recherches européennes Robert Schuman Archives nationales 2009-2022).

Marc Birchen, „Strukturkrise als ‚nationale Katastrophe'. Das Bemühen um den Strukturwandel in Luxemburg". In: Hans-Christian Herrmann (Hg.), *Die Strukturkrise an der Saar und ihr langer Schatten* (St. Ingbert: Conte Verlag 2020), 159–184.

Guy Bock, „Ein Hochofen wandert aus". In: Forum 305 (2011), 50–54.

Jean Goedert, Esch/Alzette: Geschichte und Architektur: Stadtführer (Mersch: capybarabooks 2021).

Simone Heiderscheid, Amicale des hauts-fourneaux A et B de ProfilARBED, Als Erënnerung un d'Leit vun de Schmelzen (Esch/Belval: Amicale des hauts-fourneaux A et B de ProfilARBED 2009).

Sonja Kmec, u.a., Lieux de mémoire au Luxembourg. Usages du passé et construction nationale. Erinnerungsorte in Luxembourg. Umgang mit der Vergangenheit und Konstruktion der Nation (Luxembourg: éditions saint-paul 2007).

Christophe Knebeler, Denis Scuto, Belval: passé, présent et avenir d'un site luxembourgeois exceptionnel (1911 - 2011) (Esch-sur-Alzette: Éd. Le Phare 2010).

Ed Maroldt, De leschten Héichuewen : les rendez-vous de la siderurgie luxembourgeoise avec l'avenir (Esch-sur-Alzette: 1997).

Pascal Raggi, „La désindustrialisation et les entreprises minières et sidérurgiques au Grand-Duché de Luxembourg et en Lorraine du fer (années 1960-2006)". In: Jean-Claude Daumas, Ivan Kharaba, Philippe Mioche (Hg.), *La désindustrialisation: une fatalité ?* (Besançon: Presses universitaires de Franche-Comté 2022), 103–121.

Denis Scuto, Arnaud Sauer, Laure Caregari, „Aarbechter erzielen - les ouvriers racontent". In: *Forum* 305 (2011), 18–21.