



## **François Lempérière**

**9 October 1926 ~ 26 January 2026**

On 26 January, François Lempérière passed away peacefully in Paris. In the tributes which follow on these pages, French colleagues who worked closely with him and were also his friends, eloquently describe his vast and numerous achievements and his personality. The extract, on p127, from his powerful speech given at Solar-Hydro 2024, demonstrates his profound concern for the present and future energy needs of those in the developing countries, and his ideas on how those needs could be met.

### **Luc Deroo writes:**

In November this year, like the French Committee on Dams and Reservoirs, François Lempérière would have celebrated 100 years. That would have been a very special celebration, and a very significant coincidence, in view of how much dams meant to him.

These will be relatively few words to summarise the characteristics of such a person, but I will try to describe: the construction engineer who took the lead on major projects; the innovator; and the man, with his passion for dams.

His career, spanning 75 years, encompassed numerous achievements, which earned him a page of Wikipedia. This is a rare form of recognition in our profession, and one which he shares with someone who meant a lot to him: Pierre Londe.

### **François Lempérière, the constructor**

He built many great things: dams, ports, nuclear powerplants, etc...

Here are just three examples.

Having graduated from the Ecole Polytechnique, at the age of 25, he directed work on the Donzère dam, on the Rhône, for the company Grands Travaux de Marseille. For this major structure, to be built in the full flow of the river, François Lempérière had to resort to using large submerged caissons for the construction of the foundations of the piers of the dam, where the workers laboured under compressed air.

Being a constructor in the world of dams is a demanding profession. It was on this rigorous, challenging foundation that François Lempérière built his long-term way of thinking.

The second example is Aswan dam, completed in the 1960s, but with construction having begun in 1953. GTM exported its dam

engineering expertise, and was awarded the construction contract. In 1953, François Lempérière, still quite young at the age of 27, was in charge of the Aswan dam site, with 2000 workers under his direction. Geopolitics would later interrupt the work. By being involved and observing the construction work on a daily basis, he gained profound and practical knowledge which would from then on inform his thinking on the particular challenges of masonry dams.

The third example is Cahora Bassa in Mozambique: probably one of the most defining experiences of his life. The 170 m-high arch dam, on the Zambezi river, impounds a reservoir with a capacity of  $60 \times 10^9 \text{ m}^3$ . Its construction was a vast and challenging undertaking, from both technical and logistical points of view. Most of the work was achieved in three years. Diversion of the Zambezi, in the gorge, was an unusual challenge: the water depth is around 30 m, and 50 m during flooding. François Lempérière adopted an innovative solution which was to construct two submersible rockfill cofferdams, so that work could continue throughout nine months of the year, with the cofferdams being submerged during the flood season.

### **François Lempérière, the innovator**

From his experience on construction sites, he learnt a lesson, which became a leitmotif: Faced with a new problem, do not seek solutions in old recipes; imagine something new. An example is his invention of fusegates. The first installation of these, in 1991, was at the small Lussas irrigation dam, in the Ardèche, France, very close to his family house. Then the first large-scale application

was at Shongweni dam in South Africa, in 1995.

Just recently (in January this year), at the Massingir dam, Hydroplus fusegates, by tipping as they are designed to do, safely passed a flood of  $30\,000 \text{ m}^3/\text{s}$ . François Lempérière more recently also proposed a more rustic solution for small dams: fusible blocks.

Another recent invention was the PK Weir. The objective was to improve the hydraulics of labyrinth weirs, and to find a geometry that can be adapted to the narrow width of spillway weirs and the crests of concrete dams. As with fusegates, this invention is now well known around the world, following research and prototype schemes developed with Prof Ouamane of Algeria, and also in France and Vietnam. PK Weirs have been the subject of dedicated scientific conferences, the most recent having taken place in the USA in 2025.

And this is not all. We can list plenty more concepts invented by François Lempérière, now waiting for implementation. Here are their 'baptismal names':

- Tidal gardens, which are a new type of tidal power station.
- Emerald lakes, which are pumped-storage schemes by the sea.
- Twin dams, which can transform a storage reservoir into twin basins for pumped storage.
- DANCE, a new method to lower flood levels in lowland rivers, currently under study for Paris.

These are not just ideas; they are carefully thought out and innovative concepts. It is not possible to elaborate on all of them here, but, with a strong mission to share and disseminate his new ideas, Fran-

çois Lempérière has published and presented them all, making them widely available across the world.

I think it is fair to say that François Lempérière had a passion for dams. This passion led to great achievements, earning him recognition from the entire profession, both in France and internationally. This stems not only from his expertise, but also from his exceptional personality. Some aspects stand out particularly:

**Audacity:** Because he had to dare to do everything he attempted, and usually succeeded to do, on his construction sites. Audacity was always fuelled by profound reflection, and was backed by his solid, practical experience as a construction engineer.

**Perseverance:** He needed this to advance his concepts, and have them accepted, as they were far from conventional, and he was addressing a profession which tends to be rather conservative. And this perseverance was evident until the very end, as in his last weeks he was preparing a paper.

**Open mindedness:** He was open-minded to others, and receptive to other ideas, wherever they came from. One did not need to be high ranking or well known to capture his attention.

And openness to the world. We should never forget the energy and financial support he devoted to the poorest countries of the world, through his organization Hydrocoop.

François Lempérière left us on 26 January. We have lost an exceptional engineer, a great man, and to many a dear friend. So it is a time of sadness. But rather than dwell on the sadness, we should pay tribute to him by learning from the lessons he has bequeathed to us:

- cultivating a form of well-reasoned audacity
- persevering to contribute to, as he put it, 'saving the world'
- maintaining a spirit of open mindedness, and embracing new ideas for the benefit of mankind.

Thank you, M. Lempérière, for all you have given us. You can count on us to continue your work. - *Luc Deroo, ISL, France, and Executive Board Member of CFBR.*



*The ICOLD Lifetime Achievement Award being presented to François Lempérière by Michel de Vivo, in 2018.*

#### **Denis Aelbrecht writes:**

François Lempérière passed away just three days before he was to receive a special prize at the symposium that launched CFBR's 100-year anniversary celebrations, held in Lyon on 29 January. He was in his 100th year, as is CFBR in 2026.

During this 100-year anniversary launch symposium, Luc Deroo (ISL) delivered a memorial address, recalling the immense career of François Lempérière as a dam designer and constructor (more than 130 dams in 30 countries all over the world), among which was the famous Cahora Bassa dam in Mozambique. In recent decades, while being 'officially' retired, he was continuously working to develop innovations aimed at providing enhanced resilience and safety to spillway systems: fusegates and piano-key weir technology. He also developed new concepts for water and energy infrastructure that are part of his long innovative legacy: twin dams, Emerald lakes, tidal garden layouts, 'Dance' accelerated flow to reduce flood risk.

Together with Luc Deroo, member of the Executive Board of CFBR, it was our honour to award him with the special 100-year CFBR anniversary prize. His son Bernard received this on behalf of his father (see below), and delivered personal and profound words about the tireless involvement of his father to 'save the world' ('sauver le monde')



through bringing practical solutions to respond to water and energy needs and challenges.

Beside his outstanding engineering and dam construction expertise, he was a great man with a lot of humanity. I took great pleasure in working with him on some of the innovations mentioned above, and in discussing the feasibility success criteria of some new concepts. Until very recently, he still took part in discussions and debates during the CFBR Executive Board meetings, with great enthusiasm, energy and determination.

While our professional community will miss him, his words, which introduce the special CFBR 100-year celebration film, will remain sources of inspiration to current and future generations of dam professionals, in France and abroad: "retenir l'eau, c'est lui donner le temps de servir, et d'être utile"/"retaining water is to give it time to serve and be useful"

- *Denis Aelbrecht, President, CFBR (French Committee on Dams and Reservoirs)*

#### **Michel Lino writes:**

We were deeply saddened to learn of the passing of François Lempérière, aged 99, just a few days before the Centenary Symposium of the CFBR. The French ICOLD National Committee had chosen to honour his long and remarkable career this year, paying tribute to one of its most distinguished members.

#### **A giant of the profession**

With François Lempérière's departure, the ICOLD family has lost a giant of our profession, a man of great integrity and a dear friend. I had the privilege of working alongside him since the late 1990s. Together with Pierre Londe and Jean Launais, we prepared ICOLD Bulletin 117, published in 2000, entitled 'Gravity Dam, a Dam for the Future', which introduced the concept of hardfill dams to ICOLD. Every month, we would meet in François' office, (he was then Director of Grands Travaux de Marseille), for lively and friendly working sessions, which, of course, always ended with a good meal.

Throughout my career, François was a guide and an inspiration. I always admired his inventiveness and determination. He taught me

that having a good idea is not enough for it to succeed: it takes perseverance, repeating the message tirelessly, sometimes in the face of amused or sceptical smiles, until the idea finally takes root and becomes common practice.

#### **The builder and innovator**

Above all, François was an entrepreneur in the truest sense of the word. Many of his innovations were born from addressing practical problems. He had the extraordinary talent of skillfully combining practical experience and theory, never hesitating to step off the beaten track to invent new solutions. An indefatigable worker, he continued, right up to his final days, to deepen his ideas and to convince those around him. He firmly believed in the importance of the role of the Engineer, and in their ability to improve, or even save, the world.

This conviction is especially meaningful today, at a time when science is being questioned, and in the face of the urgent climate and environmental crisis.

#### **A committed humanist**

François was also a true humanist and 'un honnête homme'. When he travelled to developing countries, he would take ICOLD bulletins at his own expense so that technical knowledge could reach those who needed it most, but who did not have easy access. He even financed small dam projects in Africa with his own money to improve the lives of local people and experiment with his innovations.

Above all, François embodied magnificent human qualities. Throughout his life, he remained warm-hearted and attentive to his peers and, above all, his family. He was generous and, paradoxically, remarkably modest. He will remain an example and an inspiration to the younger generation for a long time. - *Michel Lino, Hon. President, ICOLD*

#### **Alison Bartle writes:**

François Lempérière: A legend in the dam engineering profession, yet an extremely modest man. As can be seen in the tributes above, he was held in high esteem by colleagues and friends, and all those with whom he freely shared his expertise. At the ICOLD Congress of 2018 in Vienna, he was honoured with a Lifetime

Achievement Award, in recognition of his accomplishments in leading the construction of numerous major hydraulic works, his spirit of innovation, and his empathy with the needs of the developing countries.

In fact, he has touched the lives of many thousands of people across the world, who have benefited, whether they know it or not, from his inventions which enhanced flood control, or increased reservoir storage capacities, or which produced low-cost design solutions, through Hydrocoop.

Much of his work in recent years focused on analysing global renewable energy and storage needs for the future, and on pointing the way to how these needs might be met, especially in the developing world. Hence, his influence and impact will continue, which is quite a legacy, and certainly a contribution towards his fundamental aspiration: "sauver le monde".

In his 98th year, as Guest of Honour at our Solar-Hydro Conference in Antibes in 2024, he gave a powerful speech in the closing session. Here is an extract:

*"The difference between the developing and the rich countries is that within the tropics, close to the equator, there are no rich countries, and beyond the tropics there are virtually no poor countries. In the poor areas, there are about 6 billion people, whose per capita income is about 20 per cent of that of people in the richer countries. Ensuring their socio-economic development requires adequate supplies of electricity. In these regions, most rivers remain dry for some months, there is not much wind, and the average temperature is 20 to 25°. In these developing countries, which are sunny, the ideal solution is clearly solar PV, with a direct cost much lower than that of other solutions, leaving a large margin for investment in storage from day to night.*

*To achieve some parity with the richer countries, regarding per capita income, six or seven billion Africans and Asians in the next few decades are likely to require around 10 TW for about 3000 hours/year, of which more than 3000 GW would require storage. Some proposals for the storage of more than 3000 GW are:*

- *traditional storage between two*



*reservoirs with a difference in elevation of 100 m or more;*

- *off-river storage in large areas;*
- *the concept of twin dams at existing or new schemes;*
- *directly linking an upper reservoir with a very large river; and,*
- *exploiting the huge potential along cliffs, with the sea (or very large lakes) being used as the lower basin.*

*The activities of rich countries are adding 2°C to the climate in the poor regions, which already have high temperatures. Therefore, it would be logical for the richer nations, over several decades, to support, both financially and technically, the required storage investment in Asia and Africa. Direct agreements could be made between countries, to enhance efficiency."*

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I and others in the Aqua-Media team have been privileged to know M. Lempérière for many years (in my case at least 35 years), and it has been an honour to publish so many of his papers (more than 20 in the Journal over the past 15 years, and many more in conference proceedings). We have been glad to help in some way to disseminate his knowledge and ideas worldwide. We will greatly miss this professional collaboration, and the friendship of a kind, courteous and generous man.

A memory which will always make me smile is that one could be walking beside him on a technical or cultural tour, or sitting together during a conference dinner, and he would always have a fresh sheet of paper folded in his top pocket, and a pen, ready to draw a spontaneous sketch to illustrate one of his latest concepts, which he would be enthusiastically describing. - *Alison Bartle, and the Aqua-Media team.*