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(liste at July 1, 2006)

THE MILLAU VIADUCT
LARZAC'S EIFFEL TOWER

by

Jacques GODFRAIN
Mayor, Millau
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February 1st, 2006
Report by Loïc Vieillard-Baron
Translation by Rachel Marlin

Overview

The architectural elegance of the Millau viaduct, silhouetted against the sky at a height of more than three hundred metres is in keeping with its human, technical and financial success. However, the project had its fair share of opponents and doubters and involved making speculative choices. Jacques Godfrain, the mayor of Millau and MP (Member of Parliament) for the Aveyron *département*, who was involved in this project from the very beginning, talks about this venture as would an enthusiastic storyteller. In the space of a year, the viaduct has already greatly renewed the life of the region : the tremendous traffic jams have disappeared ; tourists now flock to the area in droves ; factories which had moved have returned to the area ; and even the number of births has increased ! However, these days it is important not to rest on our laurels. As mayor and an MP, and in an attempt to publicise this most recent asset, Jacques Godfrain explains how he finds inspiration for new ideas, steering a path between good fortune, clear vision, dreams and reality, and how he brings these ideas to life. The ideas include twinning Millau with a Spanish port town, creating an exhibition comparing Millau with the Suez Canal, and the construction of a theatre.

TALK : Jacques GODFRAIN

Over the past twelve years or so I have been one of the local people heavily involved in the Millau viaduct project. I shall describe the origins of the project, the reasons behind its construction, how the designers and the different tradespeople were chosen, and finally the impact on the valley both during the construction phase and a year after the completion of the viaduct.

Crossing the Tarn valley

The very beginning of the project dates back to 1971 when, during a speech in Le Puy, the French President announced a project for a toll-free motorway in order to open up the Massif Central and relieve the very congested Rhône valley of some of its traffic. The topic was brought up again more urgently about fifteen years ago when a route linking Clermont-Ferrand and Béziers had to be determined.

The southerly route from Clermont-Ferrand to Béziers passed through towns such as Issoire and Saint-Flour as well as through the Aubrac region. The northerly route from Béziers to Clermont-Ferrand passed through Lodève and the Larzac region. It was planned to widen the Lodève tunnel and to build a new tunnel for the Larzac region. This was not going to be easy but it was feasible. It remained to be seen how the Tarn valley – the deepest canyon in Europe – would be crossed.

A possible route was to the east of Millau, which had the advantage of reducing the distance when heading south, but which meant that the Tarn gorges had to be crossed. These gorges are well-known for their exceptional beauty and they are contenders for classification as a UNESCO patrimony of humanity.

Another possibility was to build a route more to the west, in the Roquefort region. This made sense as it provided an immediate solution to relieve heavy truck traffic congestion around the famous Roquefort cheese cellars. However, it increased the overall distance by about twenty kilometres. It also meant crossing parts of the Larzac plateau which are geologically unstable.

A third possibility was to create a route which continued the line of the current motorway very close to Millau. The overriding difficulty with this idea was the depth of the gorge, which is at its deepest at this point.

Having consulted the elected representatives, associations and the Chamber of Commerce, this third solution was chosen.

The highest bridge in the world

Two solutions were put forward as a means of crossing the gorge.

The first was the construction of a bridge at a standard height above the Tarn river. This would require hollowing out a huge trench in the red limestone plateau so that the motorway could come down to the level of the bridge and enter a long tunnel climbing back up to the Larzac. Because the subsoil is riddled with huge underground cavities, this tunnel would also have to include underground bridges.

The second solution was to link the two plateaus. However, this required the construction of a bridge at a height which had previously never been attempted.

Five design proposals

The second solution was adopted. Eight years ago, a tender was sent to engineers and architects, inviting bids for the work. Five projects were submitted.

The first two were rather traditional, consisting of a large number of pillars, a normal road surface, and unremarkable architecture. They were rapidly discarded.

The third was very unusual – even slightly strange – and was characterised by three huge metal totem poles (as the architect called them) designed to be pillars. This project interested us but, in the end, we decided that the huge metal framework involved was too much of a contrast with the natural landscape in our region. In addition, one of the pillars was to be placed in the middle of the Tarn river : this would have caused problems with flooding and current legislation would have forbidden it in any case.

The fourth project was superb. It was a huge concrete arch, approximately three times larger than the Garabit viaduct (a viaduct in the Cantal *département* built by Gustave Eiffel). It blended in well with the surrounding countryside, with its vaulted archway similar to those found in local sheep barns or churches. This project was tempting, but, during construction, the supporting structure would have had a large surface area exposed to the wind, endangering the completion of the project.

It was the fifth proposal submitted by two distinguished individuals which we adopted. One was the English architect Norman Foster, who is very much in the public eye. He is the designer of a number of very elegant buildings both in London and in the United Arab Emirates.

In our case, the 'Foster touch' is represented by the slight curve in the viaduct which allows drivers to see the succession of pillars unfold before their eyes as they start crossing the bridge. This is very impressive, as is the indentation in the pillars which combines usefulness with beauty by bringing a little fluidity to the balance and a very pure aerial line.

The second individual in this distinguished team is the French engineer Michel Virlogeux. He is primarily known for his technical expertise and specialises in cable-stayed bridges. His work and involvement in the design, as well as the work of the engineers from the department of the *Direction des routes (Ministry of Roads)*, should not be underestimated vis-à-vis that of Norman Foster. It is they who enabled the bridge to be constructed.

The choice of a builder

A year later, when the project was more detailed, a thick document which included the conditions of contract and specifications (more than three tonnes of paper) was sent to the four groups which were interested : a Swedish-German consortium ; a Franco-Spanish consortium ; Bouygues ; and Eiffage. The first two quickly withdrew when they realised that they did not have the necessary technical competence. Bouygues proposed a concrete structure, and Eiffage submitted two proposals, one for a structure made entirely of concrete and the other, half-concrete and half-metal (in other words, a metal road surface).

Technical aspects

We preferred Eiffage's half-concrete half-metal solution for two reasons. Firstly, we were concerned by the bridge's appearance. A metal road surface was lighter than a concrete one and meant that it could be constructed more thinly, using fewer cable stays to hold it up : a thickness of 4.20 metres and eleven stays were necessary for the metal version compared to a thickness of 4.70 metres and eighteen stays using concrete. The visual aspect of the viaduct, which we considered to be important, appeared to be much improved.

The second reason was the speed of the construction. If it was built in concrete, the road surface could only be laid once the pillars were completed. However, if it were in metal, the road surface

could be built simultaneously on the side and then placed on the pillars once the pillars reached the desired height. This procedure therefore saved time.

In the end, this viaduct, which was two thousand four hundred metres long and had seven pillars, the tallest of which is three hundred and forty-three metres (the highest in the world), was completed in exactly three years. The construction was carried out exactly according to the original drawings.

Technically, the vertical and the horizontal lines were constantly monitored by a geostationary satellite. It is therefore highly unlikely that this project would have been feasible twenty years ago.

Financial aspects

In addition to the technical aspects, we also found Eiffage's financial set-up more satisfactory.

Following a decision by the then Transport Minister, Jean-Claude Gayssot, to operate the viaduct under a concession agreement, the conditions of the contract were clear : the contract-holder, at a cost of approximately three hundred million Euros, had to finance, construct and manage the viaduct while the revenues would come from the toll levied on the bridge users.

Eiffage, however, had devised a financing plan using its own funds which implied that it was taking on the financial risk itself. Financially speaking, this proposition forced it to sell some of its properties around the world (head offices and buildings) in order to increase its equity capital. Since approximately 28 % of the share capital in the company is held by staff, they had to be consulted by management and the response was enthusiastic.

As far as Bouygues was concerned, it had suggested financing the project with the help of banks. However, the banks inevitably made Bouygues pay additional costs in keeping with their own assessment of the risk. Each additional intermediary such as the insurers did the same. As a whole, Bouygues' financial costs were significantly higher.

A very clean building site

The site was extremely clean both from an environmental and a social point of view. Before work began, many people thought that a professional group, such as building and civil engineering workers, would be a rough lot. It turned out not to be like this at all. As mayor of Millau, I am very pleased about the relationships which were established.

There were about five hundred people on site, just under a third of which were local people from the valley. The remainder consisted of workers specialising in these sorts of large-scale works, together with their families.

Eiffage had promised not to use any makeshift buildings to house its personnel, but to construct new, quality accommodation or to renovate old buildings in the town. It kept its promise. One day, I even signed eighty planning permission documents which is rather nice and quite unusual for the mayor of a town with twenty-two thousand inhabitants !

Two engineers who specialised in the environment and in water quality were permanently on site to make sure that nothing, and in particular no liquids, damaged the environment. There is perhaps one truffle ground where I used to walk when I was a child which had to be sacrificed !

A very human atmosphere in which to work

I was struck by the rather special atmosphere on site, perhaps because a large part of the company is owned by the staff. The workers gave the impression that they were very professional in their work. It should be noted that there were very few industrial accidents, and that the most serious accident was a dislocated shoulder which happened in an office ! When the two parts of the road surface (which had been placed to either side) were put together, the entire staff was present, and this was a very emotional moment. No-one was able to speak. It truly epitomised the success of the work of all those present.

I want to stress this emotional factor since I have realised during trips to other sites that the Millau atmosphere was rather unique. It is obvious that this experience left a very positive mark on the workers : they are the people who took part in the construction of the Millau viaduct.

The importance of their achievement was reflected by the presence of the French President and a flypast by the French air force at the inauguration. Emotions were again particularly high when the President unveiled the commemorative plaque engraved in lauze, the stone of the region, which was covered by the French flag.

Revival of the local economy

An important unpredictable factor was the effect that the viaduct would have on the valley once it started operating. Many people gloomily forecast that no-one was going to come to the town any more and that the valley would become depopulated. Some people predicted exactly the opposite. In reality, even the most optimistic forecasts were surpassed.

Of course, motorists who want to reach the Mediterranean beaches as fast as possible no longer go through Millau. But it was an illusion to think that going through Millau, and the traffic jams for which we were famous (four hours to cross the town in summer) were advantageous to local commerce. People who are trapped in traffic jams – wherever they may be – have only one thing on their minds ; to get out of the jam as quickly as possible, and not to make use of the jam for consumer purposes. Today, many motorists still pass through Millau, but do so in order to admire the viaduct. These people are in the right frame of mind to make purchases. They are much more attractive to local business people. Last year, approximately one million visitors passed through Millau.

Two new hotels have already been built, two others are in the process of being built, restaurants and various shops have opened, and so on. Visitors to the Roquefort cellars are up by 28 % and by 18 % at the Sylvanes abbey, despite being about forty kilometres from Millau.

Without a doubt, the most significant symbol of the revival of economic activity is the opening of a new glove factory. In fact, Millau built its reputation on its glove-making industry, but in the recent past, the factories closed one after another as a result of competition from other countries which had lower production costs. We recently emphasised this fact by offering a pair of gloves made in Millau to a Chinese delegation which was in Millau to study the viaduct !

Previously unknown competition in the transport network

The motorist or the truck driver who, for example, has to travel between the port of Rotterdam and the Straits of Gibraltar and Morocco has a number of alternative routes in order to cross France. He can use the Rhône Valley, or drive via Bordeaux, or via Limoges and then Toulouse, or he can use the Millau viaduct and continue towards Béziers. To have such a choice for this type of journey is unique. By contrast, in order to travel between Paris and Strasbourg or Paris and Marseilles, there is only one reasonable possibility. Having a choice of route gives rise to new and passionate issues of competition in the economics of land-based transport.

Our particular route has three important assets : it is the shortest, least expensive (because part of the motorway is free) and, in my opinion, the prettiest route. In summary, it allows one to cross

Europe in exceptionally economic and attractive conditions. All traffic forecasts concerning the viaduct have already been exceeded : truck traffic has already increased by 20 %. With a well-founded commercial approach aimed at those who travel between Rotterdam and Barcelona in order to make them aware of this new route, we should continue to promote our route.

DISCUSSION

Grey areas ?

Question : *Were there any surprises which interfered with the progress of the works ?*

Jacques Godfrain : Generally speaking, work on the site progressed according to the original plans. Once, for a few days, there was a very cold snap and a great deal of snow. The metal sheets of the road surface had to be heated up before being welded. Work slowed down slightly. The period of very high temperatures during the summer of 2003 was also difficult, but the workers were wonderful and the pace hardly slackened.

Q. : *The project which you have described appears to be faultless. The Egyptian Pyramids, medieval cathedrals, the Channel Tunnel : each had its problems. What were they for you ?*

Q. : *From experience, I know that the contracts for civil engineering works are often succeeded by ligitation which significantly increases the initial cost…*

J. G. : To my knowledge, there was no litigation related to the construction. When the commercial operation of the bridge began, Eiffage stopped working on one occasion following a hold-up in motorway traffic for several days because of heavy snowfalls. And yet its operating contract states that the State has to ensure the flow of traffic as far as the bridge. Eiffage could have brought legal action, but this would have significantly damaged relations for a relatively unimportant final saving. Eiffage was wise not to have done so.

Regarding the local economic activity in Millau, not a single property owner, restaurant owner or shopkeeper informed me that he was not paid. Generally speaking, we maintained excellent relations. One outcome is a huge increase in the number of weddings and births. Millau has become a very young town : last year, there were three hundred and forty births compared to two hundred and eighty deaths !

Q. : *This sort of project goes far beyond the scope of a mayor. From your experience, what is the mayor's specific role ?*

J. G. : It is true that most decisions go beyond the local level. One should not delude oneself : local people seldom have any power, but there are many areas where they can make their views felt, such as during the compulsory public enquiry. If the majority is opposed to the project, this will have an effect and it will be difficult for the project to succeed. Afterwards, the town council plays an important role as to whether or not the works are accepted by the population. In our case, we immediately invited the Eiffage staff to various celebrations (the Bastille Day party, and so on) to help their integration. We worked with other local people in positions of responsibility to introduce the Eiffage staff into various organisations. The site manager was elected to the Chamber of Commerce.

As I already mentioned, the site workers behaved excellently with us, but then we did try hard to integrate them as best we could. In all of this, the role of the mayor is crucial.

Ecologists

Q. : *How did you succeed in dealing with the protests of ecologists, all the more so since a local figure with a nationwide media image, José Bové, was involved ?*

J. G. : The Eiffage management was very worried about the ecologists, but in the end the disruptions were minor.

The construction of the motorway had positive aspects from the ecological point of view such as recovering and treating rainwater in clarification tanks before it was drained off into the surrounding countryside. This was a major advantage compared to a normal route. Avoiding enormous traffic jams in Millau which were clearly toxic to the environment was also an ideal which we shared with the ecologists. On the whole, the bridge itself did not produce a great deal of ecological opposition apart from the visual impact. And even this was more of a preoccupation for people back in Paris than for local groups.

The *Confédération paysanne* (the Peasant Confederation of which José Bové is a member) and similar associations objected on two occasions during the building works and forced work to be stopped, infuriating the workers. The first time, the watchword was '*Stop the multinationals !'* They quickly backed down when they realised that a large part of Eiffage's capital belonged to its employees. The second time, the demands centered on the regulations of agricultural compensation relating to the drought. When they let loose a herd of ewes onto the overheated motorway, I threatened to inform the RSPCA ! (*Royal Society for the Protection of Animals).* Derision is sometimes a good strategy !

Q. : *Apparently Arnold Schwarzenegger contacted you. Why ?*

J. G. : The afternoon the viaduct was inaugurated, the Governor of California's chief-of-staff telephoned me to say that he had just watched the inauguration on television and that he had been very surprised to see that there were no ecological demonstrators. He said that in California they have many problems with such demonstrators in relation to the new bridge in the San Francisco Bay Area. He asked me to come to tell him our secret ! Since I did not have the time, I handed the task over to one of my friends, Senator Guerri, who indeed went out there recently. The affair is taking its course…

Q. : *Has the construction of the viaduct changed the route of migratory birds ? Certain varieties are known to follow specific routes.*

J. G. : Honestly, I do not know. But… I shall think about your question. When the occasion arises, I will discuss it with the NSPB (National Society for the Protection of Birds) !

Economic effects

Q. : *Can you tell us exactly the origins of the workers on the site and what happened to them once the project was finished ?*

J. G. : I do not know the exact figures. But I think that out of the five hundred people employed on the site, approximately one hundred and fifty had been employed in the Lozère and Aveyron *départements*. I know that Eiffage had trouble in finding welders. Luckily, the *Chantiers de l'Atlantique* (an ocean-liner construction company) was going through a slack period at this time. A certain number of our welders came from their site in Saint-Nazaire. Others came from the island of Réunion, where apparently there are excellent welders. Among those people who were employed in our region, about fifty stayed with Eiffage and are now working on their sites elsewhere.

Q. : *What have been the effects on the local economy ?*

J. G. : Since a great number of people come to admire the viaduct, the effects on the catering trade, cafés and the small tourist industry trade have been important. However, the fact that people come to admire the viaduct has also had other more surprising effects. It has motivated

businessmen to come to Millau. Before the existence of the viaduct, central purchasing agents from the Paris region were very hesitant about coming out to Millau because they felt that they were wasting a great deal of time on travel. Now, however, they have decided that they will come and also go sightseeing. Therefore, they readily come and buy from us. I know several local companies which have increased their turnover as a result, and have taken on more employees. There are no limits to what a reputation can bring with it. Our companies are now beginning to understand the value of the viaduct and many more of them are creating letterheads or documents with a picture of it.

Q. : *I have heard that you were going to develop a logistics activity.*

J. G. : Yes, this project is progressing but it is not easy because there is not much space to build large centres. On the lower ground, the areas are liable to flooding while higher up it is slippery. It is not easy to want to have both the landscape and the industrial activity all at once. One has to manage to design a perfect architectural project. We are getting there...

Lasting ideas

Q. : *Have you considered how you will manage to remain an attraction in the long-term ? Amusement parks are very aware of the fact that they have to find constantly new ideas to survive. Is this also an issue for you ? What is the situation with the number of visitors to the pont de Normandie (another spectacular bridge near Le Havre which spans the Seine) ?*

J. G. : I believe that the number of visitors has been more or less stable over the past ten years. This is a good sign for us. By comparison with various tourist centres and amusement parks, one should not underestimate something which is free of charge. This is a very important factor because it costs nothing to look at the viaduct, and one can do so when one wants and from where one wants. Personally I am always on the look-out for new ideas to regenerate interest. I already have a few ideas. For example, I suggested making the biggest sundial in the world by using one of the pillars to cast a shadow. We would plant trees all around the pillar, each of a different species – oak, maple and so on – to mark each hour. One could also envisage events such as a *son et lumière* show. We must not forget the varied human populations ; children, adults, old people, and so on. For example, we have already designed a beautiful museum with scale models of works of art : its originality is that it has been developed with blind people in mind as the models present different elements such as the river, the road etc. which are made from specific materials which can be recognised by touch. The inspiration for this came from a meeting with a blind man who had come to 'see' the viaduct. I said to him 'you have come to see the viaduct ?' and he replied 'blind people cannot see, but we can feel things.' His answer made an impression on me and I wondered how to build on this.

Obviously one should always keep things moving. I am constantly on the alert in order to take advantage of any opportunities. We are currently organising a very beautiful exhibition in Millau which compares two large connecting systems : the Suez canal and our viaduct. The Egyptians were very sensitive to this symbolism and they lent us some very beautiful objects. We have just created a customs zone with the appropriate authorities near the bridge and I recently twinned Millau with Sagunto. The relationship is as follows : Sagunto is a Spanish port which owes most of its expansion to the overdevelopment of the neighbouring port of Valencia. The idea is to allow the merchandise which is unloaded at Sagunto and which needs to be transported north to be cleared through customs in Millau. The Spanish appear to have understood the advantage of this process. We shall have to wait and see how it progresses with time.

Q. : *Have you thought of helicopter flights for wealthier tourists. That would be fantastic !*

J. G. : Yes, but we had to abandon this because apparently helicopters are very noisy and disturb a rather rare species of bird, the tawny vulture, which nests in the Tarn valley. On the other hand, there are a huge number of small aeroplanes. They make rather a lot of noise and disturb humans too ! However, we cannot have everything, economic activity and complete tranquillity. Every choice in one direction means that there is a sacrifice to be made in another…

As far as aeroplanes are concerned, an anecdote comes to mind which emphasises the importance of being on one's toes at every opportunity in order to keep our viaduct in the forefront. When I was travelling by aeroplane from Paris to Montpellier, I saw the viaduct out of the window. I immediately asked the pilot to announce this and everyone rushed to the windows ! I subsequently asked the Air France CEO to ask his pilots to point out the viaduct and he agreed. Hundreds of people every day can now admire it from a great height !

Q. : *On a personal level, is the viaduct likely to be politically important for you ?*

J. G. : The success of this work clearly makes me very happy. Every elected representative wants to make a mark in his time in office. However, in my opinion, what really makes a mayor stand out is his cultural policy. In this area, I would like to leave my mark, by reviving a theatre – this is currently taking place – and by launching light opera. This was one of my passions when I was young. I once had a walk-on part in the Toulouse Capitole Theatre.

Q. : *Your talk is overflowing with enthusiasm. In today's society, people have a negative mentality : you should go around telling this story. It reminds me of Pierre-Gilles de Gennes who, having been awarded the Nobel Prize for physics, toured the lycées throughout France to talk about science and his own exploits. I noticed that like you, he was a remarkable storyteller and that he brought a great deal of energy and sense to many people.*

Presentation of the speaker :

Jacques Godfrain : after studying economics he made his career in the air transport sector, occupying various managerial positions. He has been an MP for the Aveyron *département* since 1978 ; mayor of Millau since 1991 ; he was Minister for Cooperation between 1995 and 1997 ; secretary for the foreign affairs commission ; member of the supervisory board for the French development agency (*Agence française de développement*) ; and president of the France-Gabon friendship alliance group. He lists one of his successes as having facilitated the construction of the Millau viaduct. His future project will be to inaugurate a new theatre in Millau and to develop a taste for culture there.

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