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TRAMWAYS À LA FRANÇAISE

english version

A short history...

1977: Nantes. The new mayor, Alain Chénard, launched a tramway project when the major trend was the Val métro designed by Matra, about to be put into service in Lille. Matra emissaries were crisscrossing France to convince elected officials in the big cities to launch métro projects. It was the case in Strasbourg, Bordeaux, Toulouse, Rennes... They argued that the Val was modern, rapid, efficient, and would not be problematic for cars, since it only affected the subsoil. On the other hand, tramways were to their mind outdated and even old-fashioned, noisy, slow... If all municipalities had dismantled their networks, for them, this was proof that it was a means of transport unsuitable for modern cities. French cities had abandoned the tramway since the 1960s; it now seemed its definitive death had been decreed; only Saint-Étienne had maintained and even enlarged its network, whereas Germany, the Netherlands and Switzerland continued to develop theirs in all their cities, to the contrary of France.

Fortunately, a few brave municipalities challenged the taboo and had tramway projects under study; this was the case in Grenoble, Rouen and Nantes in the late 1970s.

1989: Strasbourg. The new mayor, Catherine Trautmann, decided to stop the Val project that Matra, having convinced Marcel Rudloff to renounce the tramway option settled on by his predecessor, Pierre Pfmilin, had been studying since 1983. She had study undertaken for a tramway project, the means of transport she thought the most suitable for her city. Moreover, her vision as to how it would fit into the urban space had been very carefully thought out. She therefore set a few conditions that absolutely had to be complied with. First, she wanted the rolling stock to have a contemporary design, but one that could fit seamlessly into a city of architectural heritage. The tramway then needed to be rapid, with a low floor fully level with the platforms; it needed to be air-conditioned in summer and heated in winter; have seating as comfortable as possible; and include large glass windows so passengers could see the city. Last, the mayor of Strasbourg launched several competitions to requalify the public spaces, to make the urban integration successful, to again make the city delightful: lawn, trees and sculptures along the tramway route.

1995: Bordeaux. The new mayor, Alain Juppé, decided to give Bordeaux a tramway network. He abandoned the Val project, aborted under his predecessor, in favour of a different and more urban vision, taking inspiration not only from the Nantes experience, but especially that of Strasbourg. The tramway project, therefore, has become a remarkable tool for urban development, both as a means of transport and as an

opportunity to requalify a certain number of emblematic squares and quays, without forgetting the creation of major centres drawing visitors and a chance to link Bordeaux's two riverbanks.

The tramway back in favour and emergence of a french school. Bordeaux set a wonderful example and in subsequent years there was a rise in tramway projects in over 15 major French cities; this was with the special characteristic (it could be said, a «French school») of each seeking to link implementation of the tramway and urban development. Hence the new presence of designers - architects, landscapers and city planners - on the team. In this matter well-known figures came to the fore such as Alfred Peter in Strasbourg, Bruno Fortier in Nantes, Brochet-Lajus-Pueyo in Bordeaux, Bruno Dumetier in Lyon, Antoine Grumbach in Paris, and Thomas Richez_Associés in Le Mans and Reims. Given the success the projects had in urban terms, these contractors have been called on to design tramway networks abroad, proving the success of trams "à la française".

Among these designers, the agency Richez_Associés is an emblematic team in bringing together top expertise for creating public spaces, landscaping, artworks and transports. Examples abound: Orléans, Le Mans, Brest, Tours, Reims, Paris, Casablanca, La Réunion, Bordeaux, Liège... whether a tramway project, a transfer hub or a public space.

The agency very astutely understood the tramway's strategic linking role in urban development. It completely grasped the need for an overall approach, to fit the tramway into public spaces simultaneously requalified, to give it its necessary visibility in the city, and to take the project from start to finish to integrate this new and powerful object into the city.

This approach is pertinent because it results from over 20 years of know-how as well as on-going conceptual work. This allows Richez_Associés globally to take a head-on approach in the realms of architecture, city planning and landscaping.

The agency also works in the areas of housing, the workplace and trade, creating public installations as well as industrial buildings; it is also attentive to how an environment is staged as well as to street furniture. Its experience in France and abroad bears witness to remarkable mastery of diversified, complex projects which inform and enrich each other. Having personally greatly contributed to this adventure of the tramway as director of the city planning agencies of Strasbourg, then Bordeaux, I met Richez_Associés in Liège. I saw the network and I invite you with pleasure to discover their experience with the tramway "à la française" in the pages that follow.

Francis Cuillier. City planning consultant, former managing director of the city planning agencies of Strasbourg and Bordeaux, Grand Prix de l'Urbanisme 2006

Did you know that the tramway first developed as a form of horse-drawn transportation? It was in the 18th century that the British engineer James Outram discovered the value of traction combined with rails. The first «railroads» were then built in a straight line using parallel beams, forming the rails on which horses drew carriages. But in France, it was thanks to the 1878 Paris World Exhibition and the triumph of electricity that the tramway truly made its debut. Cities in other regions adopted it almost immediately as well. A real alternative to noisy, polluting steam engines, the tramway became a symbol of progress and modernity. On the eve of World War I, as many as about 100 French cities had tramways.

With assembly-line construction of automobiles, roads were quickly congested. Little by little, the tramway came to be seen as an archaic means of transportation. Following World War II, city elders abandoned the aging equipment, too slow and too closely attached to its track. Buses and cars, both rapid and independent, were the new symbols of modernity, essential values in the developing consumer society. Within a few years, almost all tramway networks were destroyed, with the exception of those in Lille, Saint-Étienne and Marseille.

By the end of the 30-year post-war boom known as the “Trente Glorieuses”, the tramway had been forgotten. The post-war reconstruction era in France brought new thinking about how to get around, in connection with development of the State territory and individual movement: Georges Pompidou said, «the city has to adapt to the automobile».

The first oil crisis in 1973 started to change thinking. At the initiative of Secretary of State for Transports Marcel Cavaillé, the tramway made something of a comeback, even if people had trouble accepting the idea. In 1985, the first line was inaugurated in Nantes, launching revival of this means of transportation. Very soon after, in 1987, Grenoble gave France an example of the «standard» tramway; it functioned much like a bus, even though it was on a rail. Next came Rouen and the T1 tramway between Saint-Denis and Bobigny in the Île-de-France region.

Without going into the long list of tramways built since then, the case of Strasbourg in 1989 should be mentioned in particular; it led the way for tramways «à la française», which brought two innovations. The first was technical: an entirely low, flat floor, adopted everywhere since then. The second was political: previously dedicated roads were shared and intense urban requalification began.

In 2013, France has 26 cities with tramway lines, all showcasing French know-how.

Each period has its own system of values, in sync with its own do-

minant vision: today it is compactness, diversity, density, sustainable development, the fight against greenhouse gas emissions, reclamation of public space, non-motorized mobility and mass transit. The «all-for-the-car» era dear to late 20th century functionalism is over. Banished 50 years ago, the tramway was back in fashion by the 1980s and 1990s. Despite the concerns its installation gives rise to, the results are there to be seen everywhere and they are systematically positive. The notions of urban renewal and modern transportation can be successfully combined. Horizontal and mobile, its silent, multi-coloured cars profiled against the sky, the tramway brings social cohesion, development and embellishment to a city, as well as economic dynamism.

This phenomenon plays a part in ecological debate as it responds to the new social, environmental and economic realities recorded in 2007 by the first Grenelle Environment conference. Abroad, the situation is similar: northern Africa, Israel, Latin America, China, Europe, Maghreb, the Arabian Peninsula, etc. Numerous tramway projects are appearing on all continents.

Mobility, time and space

The transportation problematic is, both literally and figuratively, a way of entering into the realm of a city's space.

Continually in development, the city is a «living organism», constantly evolving to incorporate all socio-economic realities. The never-ending story of the urban space, created as it is through successive change, is fundamentally written by the issue of mobility: the issues of how city dwellers get around and how their city develops are the one and the same. Unlike post-war policy that designed space in accordance with a notion of stability - zoning, large units - today's world is based on mobility - educational, virtual, material, all at once - to participate in the modern world. Éric Le Breton, Pierre Veltz, Marc Desportes, François Ascher, Francis Beaucire, Jacques Lévy... Countless sociologists, economists, geographers and planners have addressed the issue.

It is worth noting how the semantics have evolved: «mobility's» broad scope, related to a services economy, has overtaken «transportation infrastructure» logic. While the 20th century was concerned with speed, mobility today requires control over time and space: users can adjust to slowness as long as the amount of time it takes to travel a certain distance is guaranteed. Tramways «corner» at 19/20 kilometres an hour; contrary to automobiles, meaning a day in the city can be put together with a fair degree of certainty.

Diversity of scales

It was long thought that roads made a city and that an intersection was enough to create city life. But the experience of modern urbanism has shown that tracing routes is not enough to create a real quality of urban life. The context must still be analysed, customs pinned down, given a scale, an atmosphere determined... Owing to their relation to the city and to the landscape, tramways «à la française» - an urban, modern, quiet, aesthetic, clean transportation project - supposes multi-

faceted work, bringing in-depth change, from across the metropolis at large right down to the positioning of curbs. Sharing the public space in this way offers a chance to develop and embellish cities well beyond the scope of the traffic corridor. Giving uniformity to the surrounding area recreates visible, ordered continuity; a structuring axis does this by linking the centre to the outskirts, orchestrating a new arrangement, facade to facade. The tramway – city planner, landscaper, architect down to the smallest details, working at the underpinnings of the city - brings usefulness and city life together. Sights are set just as high for the rolling stock: the contemporary tramway has low floors to meet platforms; they are entirely glassed to open onto a view of the city; carefully designed, they are often adapted to the new, quality image that the city calls for. There are many examples: the transformation or even embellishment of Le Mans, Brest and Orléans speak for themselves.

Sharing roads

Installing a tramway line involves more than infrastructure. It's also about resolving the combination of spatial, functional and technical problems to create a clear perception of public spaces previously reserved for cars, while maintaining a good understanding of users' concerns. It's also about getting past project partners' sometimes contradictory expectations and knowing how to get everyone pulling together. How does this large piece of machinery get put on a platform on the site in question, in space intended for other purposes and already 60% occupied by cars? What answer can be given to those who want it all, who want not only broader pavements and parking spaces maintained, but also to have cycling paths and additional trees? The sudden appearance of a long empty flat ribbon 6 m wide, whether crossing or following the road will necessarily mean prioritizing needs and making political choices (two-way streets become one-way streets, parking places eliminated, etc.). While this debate is systematic in the case of a first line, there is no further debate with the second, as will be seen in Orléans.

Linking up city life

More than any other means of transport, tramways are a marvellous tool for requalification of a territory. It brings flow to an existing city, taking into account geography and topography; it extends perspectives, suggests ways to open up closed spaces; it links archipelagos, returns to coherency, shares the public space to offer multiple means of transportation; it highlights central points, ties together abandoned areas and shows the way to future developments. Beyond notions of centre or outskirts, the breadth of the territory is a space of life, and the tramway is like its "umbilical cord". A means of transport facilitating movement, it is also means of redeploying metropolitan functions by making all districts equally important, treated identically by the line itself. Look at Brest, Le Mans, Reims...

Henceforth, the city lives differently. The territory orders itself and develops coherency with the «corridor of mobility», 500 m on either side of the line. New centres of city life appear around the stations, true spaces

for sociability, calming and calmed. With its steady, dignified movements, the tramway re-establishes the idea of a pleasant outing, even more real given that over half of these trips have nothing to do with work.

The city's interior design

In these places entangled in the complex issues of urban development, usage and transports, the tramway is a one-way ticket to urban redefinition... The major trend in current politics, it is the strong-arm of contemporary city planning turned more to developing city life: weaving back together, repairing what is damaged, creating links, embellishing. Doing this, the tramway is what gives order to the public space, spearheading quality of life in the city. The public space belonging to all, it opens itself up to amenities: welcoming, comfortable, convivial, aware, calm, aesthetic, it encourages engineering to find ideal solutions. This is why the arrival of the tramway is a chance to change a city's image and to bring major change in mentalities. Change, of course, is worrisome, especially in times when values are put into question. But the fact remains. The city of Le Mans is easier to understand, more coherent. Reims has made its avenues greater. Largely mineral Brest has welcomed Nature in its midst, Orléans has embellished itself, etc.

Transversal and multi-disciplinary

At the meeting point of numerous disciplines, creating a tramway line and re-ordering the public space as a result requires a unique methodology and teams producing across-the-board designs. In this manner, going beyond its role of stitching geographies together, the tramway is a great intermediary: it brings together urban planning and engineering, architecture and design, landscape and art as well as a multitude of players - investors, managers, operators, users, elected officials, residents, contractors, owners - all defending their own interests. In this cacophony, the idea remains that understanding of the other is necessary to make possible a project that amounts to squaring the circle. This is because we are not fully aware of the time and patience it takes to clear away the contradictions and staggering complex issues that come with creating a tramway line. Simply spending money has never made it possible to win the day. It is necessary to listen, of course, to know how to let go sometimes, so that each gets what he wants. In other words, prioritizing. This is indeed the method that the Richez_Associés agency uses: among these complex issues, proposing a strategy and the «city's interior design» to give life to the project. For 20 years, the agency has designed and implemented, in powerful groups and in line with strictly supervised schedules, projects best drawing together everything done in cities by transportations, pedestrians, bicycles, and cars, in a renewed space, granted the very best characteristics of use and image... But in the battle, there is one area in which Richez_Associés stands firm: development of the stations, the jewels of the line. It is this know-how specific to the agency that won it the 2008 engineering Grand Prix awarded by Villes et Transports magazine.

While change is disturbing, the resistance it causes can also bring transformation. At the risk of going against Paul Virilio, who holds that the architect speaks for the stable, for inertia, here are the architects of movement, who compose with space. Interview with Thomas Richez, architect, engineer, city planner.

How far back does the invention of the tramway go?

Specialists don't agree on the origin of the name, but it is sure that English engineer Benjamin Outram discovered in 1775 that carriages on metal rails had four times more traction than on streets. The first line of this type, laid in 1776, was called «Outram's way». His son James then perfected the system: in this way, Great Britain had a horse-drawn tramway by about 1820. This permitted optimizing this type of traction, reducing the number of horses in the streets as well as their droppings - which was a real hygiene and maintenance problem in big cities like London and Paris! This is how the tram came into being, living its Golden Age until being replaced by buses during the Trente Glorieuses post-war period in France.

How did your firm become interested in tramway projects?

It goes back to the 1980s. At the time, city centres had lost the competition with shopping centres on the outskirts; the fundamental problem was encouraging access to downtowns to once again make them economically dynamic. At the time, tramways were still very expensive, but bus networks were not functioning well; trapped in road traffic, they no longer provided the service expected. The solution to get things working properly again was to make a dedicated space for buses, but this was a real problem when it came to convincing the decision-making elected officials. Nevertheless, little by little, and doubtlessly owing to the tramway's image - a new subject in cities - network managers and elected officials understood the need for new ways of bringing in public transport, conceived as urban development projects to redesign city centres. Transports and city planning were joined together and, very early on, I was consulted in this regard. This is how Le Mans project came about by 1991.

With the exception of Lille and Saint- Étienne, all first-generation tramways have been destroyed. Whereas today only «French-style tramways» are on the scene. What does that mean?

French-style tramways incarnate a systematic vision: using tramway line creation to develop a city project, in particular redesign of public areas, leading both to a new way of sharing space and development of a better urban landscape and life.

At project conception, when we are studying how to fit a tramway in its place, I sometimes make the comparison with the household strategy behind dishwashers: either, right from the start, you make room to ins-

tall it in the kitchen; or, you take advantage to repaint the kitchen and redo the counter space; or you launch the project you've talked about so much while enlarging the kitchen, finally building the veranda you've always wanted. In Le Mans, the tandem of former Mayor Robert Jarry and current Mayor Jean-Claude Boulard opted for this last solution. They installed the tramway in prominent locations, turning its installation into an overall redesign of the downtown that included transport. For this reason they called on a group whose representative was a city planner and architect - an important point - assisted by transport engineers. This is how we came to undertake two studies, and then we handled project management as we did in Nancy.

The French-style tramway means taking this logic as far as it goes, with urban projects as part of the package, including quality façade to façade renovation. It's a way of profoundly changing how the city is used, and at the same time, its image. It's also about rolling stock that positions itself on the same level as the platform, comfortable seating, temperature, movement quality, big glass windows open onto the urban space and personalized design that can represent the city; this is why it's often chosen in collaboration with residents. The French-style tramway has been an example abroad: we are currently creating tramways for Casablanca, in Morocco, and studying one for Liège and another one for Brussels in Belgium.

What is the architect's job in installing a tramway line? Are you even involved in choosing the route?

Not always, but we are delighted when we're on board as early as that. The route is often that of the most frequented bus line, but we absolutely have to take into account what elected officials and users expect. Forays must be made into operating technique so specialists can be understood and dialogue created.

Our involvement begins with the choice of services on a macro scale; this is strategic for the city. On a smaller scale, we think about fitting the line into the city, depending on street and pavement width, topography and levels - everything can depend on a few centimetres! - as well as the quality of the resulting space. There's also the issue of how to design the line, as something unified or varied, which has an impact on the choice of materials, street furniture and tramway power supply. Once the route has been broadly defined, we design the preliminary project on a scale of 1/500 before, for the most part, the design office brings it down to 1/200, with the exception of the pedestrian or historic districts, which we always come back to. During the works, we're always on the ready to implement details, because it's our role to ensure quality on everything visible. We also direct everything concerning plantings and furniture.

Has the fact that you're both an architect and engineer contributed to development of this type of work?

It's sure that my engineering training makes it easy to talk to the engineering firms. Nevertheless, I have colleagues active in the same realm who are purely architects or landscapers and who do very interesting

work. The important thing is to be able to think coherently, sensitively and concretely about the public space, right down to its smallest details. This falls in the realm of the work that city planners, architects and landscapers do. The wonderful thing that our firm can offer is that we are really a powerhouse of trans-disciplinary project managers, very committed and able to bear the responsibility of projects of this size over time.

How does the work of fitting the tramway into its place get organized?

We are obviously dependent on the budget, road width and car traffic management issues. Concerning the contextual work, a first relationship is established with the buildings; these set a city apart and are superposed on a more or less apparent geography. Delineating public space and counterbalancing the rolling stock, the developed site determines a relation of scale and gives rise to a range of more or less sophisticated materials, textures, stereotomies and colours for development of the ground and furniture. In both Casablanca and Brest, we carefully studied cement formulations and pigmentations to find a composition to work with the developed area and the city's ground. Different textures were included at specific points. Everything was designed down to the smallest detail. Then, as the locations are linked together, the route achieves a more global geographic scale.

How do the stations express the tramway line's quality?

Generally speaking, the station is where both the tramway and pedestrians stop. It is both access to the means of transport and a place to wait. It's a static framework for the kinetic activity of the tramway. Equipped with furniture design to a greater or lesser degree, and with technical equipment, it's both a strategic reference point, a place of polarity and a shelter. It forms a micro-city unit that must provide a certain number of services and amenities: it must feel good, be a comfortable space where you can sit down, buy your ticket, have a little light, know how long you have to wait, look at the network map, etc. The complete opposite of Cary Grant in North by Northwest, standing at the edge of his dusty road... The fact of the stations being at regular intervals very quickly marks out the transport system. Planning choices can lead to a «chameleon» route defined by place, whereby the stations take precedence over the line and are conceived as attractive, visible aspects of the network, reflecting the image of the site they service. This is what was planned for the LRT (Light Rail Transit) for Reunion Island, where each town adopted its own colour code. In the alternative, showcasing rather the link means the tramway is a unifying element that treats users with the same quality of service in every district, manifesting the French Republic's values of equality.

Today, all cities are proud to say they have built one or several lines. Is the tramway a fashion or does it incarnate the city of the 21st century?

It can't be just a fashion. The tramway is not some piece of clothing you throw out at the end of the season. Financially, a line and the rolling stock are amortized over twenty or thirty years. We are in a very different framework of time than the one mere fashion operates in.

Moreover, all the cities who have "bought themselves" a line have decided on a second line, or more; it's therefore an on-going choice in those cities who have tried it.

The basic idea driving this is that before being a place for car traffic, the public space is a common area in cities where primarily people live, walk and should live better. Today we have a complete reversal of the rules on how the public space is used, with car traffic under control and priority given to pedestrians; tramway transport and bus network reorganization necessarily follows.

What is the advantage of the tramway over trolleys or buses in their own space?

The tramway's very nature implies breadth, fluidity, urban comfort. Being attached to the ground in its own route and with priority at traffic lights - a priority indispensable to quality transport service - helps regulate traffic. These are the keys to its success. Technically, they can be achieved for the bus, but they are politically more difficult to push through, because the bus marks its territory less. The trolley or the bus has the flexibility of a road designed for vehicles, but they are just vehicles themselves, whereas the tramway in its rails imposes respect. It has symbolic value, even a reassuring psychological aspect due to its appearance: structured and structuring, always there on its rails, comfortable, sure, clean, modern, it's a reference point in a city. Last but not least, the tramway has a greater transport capacity than a bus.

Does the installation of a tramway line weigh heavily in local finances?

Not directly; there are two financial factors very favourable to development of tramway projects in France. The Conseil d'État, in what is known as the Saint-Denis order, ratified the fact that the costs of moving a privately-managed network (water, gas, electricity, telecommunications, etc.) to make way for a tramway should fall to the service provider. But the biggest argument is that public transport is not financed by the general budget of local authorities, but by the «transport contribution», a para-fiscal tax on salaries that all public and private employers pay if there are more than ten employees. The rate of this "transport contribution" is decided by the local authority and can be increased up to 0.8% of the payroll in the case of a tramway project. It is therefore a resource that local elected officials can decide to use without their electorate having to directly bear the cost via a local tax. This has obviously been an essential favourable factor in these projects!

And what is the economic fallout?

Beyond the worksite period, which only has economic meaning if the investment in the tramway is efficient, the fallout is in the realm of overall socio-economic interest, because the commercial revenues would never pay for the investment, just part of the operation. But it's just as true that a road doesn't generate any direct income. The difference lies in the existence of a significant tramway operation cost, not covered by commercial revenues. But socio-economic studies clearly show

that this transport has an overall cost less than an individual car, and it has interesting repercussions: the Caracas subway, for example, was closely studied. It has obviously permitted a great many people to be employed at a distance from their homes and has been a very powerful drive in economic development.

Today in France a city of over 200,000 inhabitants that doesn't have a tramway is not attractive - you feel it clearly; and you see signs of the tramway's economic interest in the real estate market and business; the arrival of the tramway spurs commercial renewal in downtowns. Property values benefit directly, key money and housing values rise within 500 metres either side of the line: worth is visibly being created!

Does a first line get conceived the same way as later ones?

The difference between a first line and the ones that follow is the inhabitants' degree of general upset in terms of car traffic and parking. In this sense, the issue of sharing space is a long-term exercise. A city putting in a first line wants everything: a tramway track, traffic lanes, parking, cycling paths, comfortable pavements for pedestrians, green spaces... Yet all of this is often incompatible with road width. Choices therefore have to be made, one-way streets have to be created, places to park, which always brings up reactions.

For the lines that follow, residents will have understood their interest in there being less room for cars and having lighter traffic, and they expect more comfort and quiet. When Strasbourg installed its second line, residents complained to landscaper Alfred Peter, to his great surprise, that in his early proposals he hadn't sufficiently reduced the place for cars.

What interest do you find in this major transport projects?

They are very extensive projects that change a city's geography and image. The tramway creates new, visible spaces... Le Mans, Brest and Orléans are wonderful examples. Putting a tramway in a city means first creating a new way of dividing the urban space, to the detriment of the car, which has almost insidiously colonized it over the past thirty years. The tram track is a long ribbon six metres wide, a long regulating strip, empty most of the time: the tramway goes by on average every 3 minutes. Three minutes of emptiness and silence - that already is very soothing. It's already an empty space that draws attention to itself: the ground we've forgotten about spreads out as if stretched by the rails, going to the foot of the façades, opening up new perspectives: the horizon of the city, its distances, hitherto hidden by the great many vehicles, the elements of the streets so often disparate - signs, traffic lights, telephone booths, technical cabinets... - and sometimes even too much vegetation. This heap is swept aside by the big spring cleaning of the façade to façade renovation. The city returns its landscape, its buildings and their architecture to the forefront.

All that is left is to rewrite the script of city design: well-graded soils, carefully-drawn borders, similar and judiciously straight overhead contact line posts, a simple range of materials, a parsimonious scattering of furniture and, as often as possible, the embellishment of a tree... Patiently adding all these small attentions, meter by meter, profoundly

changes the city. The moment, at the inauguration, when the public takes possession of this renewed city, is always very moving.

Thomas Richez is cofounder, partner and president of Richez Associés and Director of Z D R in Kuala Lumpur. He was president of the AFEX (Association des Architectes Français à l'Export) from 2002 to 2008. Together with Édouard François, partner from 1985 to 1991, Bertrand Dubus, partner from 1985 to 2008, Zaini Zainul, partner since 1997, then Frédéric Blerot and Vincent Cottet since 2009, he has developed the firm's activity in France and Asia: towers in Euralille, a French Embassy in Singapore, the Putrajaya town hall, etc.; the activity of urban design and public spaces: architect and coordinator of the Vaugirard development and Charolais-Rotonde in Paris, the new town of Putrajaya in Malaysia, Les Grisettes development in Montpellier, etc.; expertise on transport projects: the tramways of Le Mans, Reims, Orléans, Brest, Casablanca, Tours, Liège, etc., the tram-train of Reunion Island, Éole-Évangile in Paris, the hubs at Argenteuil, Sartrouville, Choisy-le-Roi, Lens, La Baule, etc. He is currently working on preliminary requisite studies for 13 train stations for the Grand Paris project.

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A CROSS-CUTTING APPROACH THAT GIVES DIRECTION / INTERVIEW WITH VINCENT COTTET, LANDSCAPE ARCHITECT AND PARTNER AT RICHEZ_ASSOCIÉS

What role does the landscape architect play in an architectural firm, and more specifically in a tramway project?

Owing to his training and sensitivities, a landscape architect has a very special approach to transport infrastructure projects. First, just as for his colleagues, the architects and city planners, he looks at the site's geography to take in the scale for this type of atypical project. Next, and still just like his colleagues but from a different angle, his viewpoint and understanding of the context allows him to put the transport infrastructure in special relation to its location, whether in determining the route or designing interoperable areas. In practical terms, it is his knowledge and appropriate use of plants that simplifies fitting the project into its location.

As tramway landscape architect and designer, what obstacles do you come up against most often?

Too often a landscape architect is assigned to the simple role of being a plant specialist; in reality his work today makes him more of a generalist, urban designer. The rock bed of our training teaches us to have cross-cutting view of the space in question, whether it is densely occupied or open. A landscape architect can carry an entire urban design project owing to his fine understanding of geography, history and context. In essence, his knowledge goes beyond that of the constructed space: he analyses the environment and how it is put together to link the site

to its context. He takes sociological, geographical, cultural and political data into account. This means he can fit the project into continuity while keeping a hand on its scale.

Disciplines overlap much more today, and this is why over the past 20 years or so Richez_Associés has more and more frequently taken an interdisciplinary approach to architecture, city planning and landscaping. It means we can offer another way of looking at a project.

Do you have an impact on the shape the tramway route takes?

Generally speaking the route has been validated even before we start working. But our different landscaping approach may modify the route and extent of the project. Very often in big railway infrastructure projects like the Massy-Évry LRT (Light Rail Transit), the route adapts to the geography as if melding into one. This sometimes makes it possible to bring out special characteristics and create a new landscape.

What do you mean by the route adapting to the geography?

There are several ways of looking at it. When the project is in an existing terrain with balance to it, a landscape that reads well and has natural coherency, there is no issue whatsoever. The designer then has to have humility to simply fit the infrastructure into place as best as possible, in other words, by creating the best possible relationship between it and its site.

But we more often work on sites that have been reworked, damaged, significantly altered or have lost all their worth, whether from a geographical, cultural or social viewpoint. It then falls to us to give a new identity to the site, employing the transport infrastructure creation to bring coherency to the location. This is when we can start to talk about a melding. Here's a concrete example: on Massy-Évry LRT, creation of the A6 motorway had left in its wake fundamental changes to both the landscape and the surrounding urban environment. The implantation of the LRT meant we could create new hubs, new bases, new references that would serve as references for the territory. Materially speaking, this means that the stations are at an altitude that becomes the reference for any future urban development. Or alternatively, the route may be pressed against, sent over or set back from the site to produce this or that. It is this kind of work that no one thinks of or sees. But the existing or future consistency of the city relies on it. This is what connects two city blocks together, or two neighbourhoods.

Once the route is defined, how does the tramway come to fit into the urban services?

Let's take the case of Brest. There was a great deal of uniformity to the corridor, but it left a little room for landmarks. This is why, very early on, we identified specific sites good for creating new ones. This is key in creating a line: you think of the tramway less as a piece of string, and more as a pearl necklace. Each pearl is unique, each contributing in its own way to the overall quality of the tramway trip.

Brest is right against the sea, and the surrounding countryside is reached by enormous roundabouts at the city's edge. We wanted to create

more flow between the city and the countryside, without urban spread. At Brest's western edge we reduced the huge roundabout to a simple intersection. This created an open, empty space, hugely important for the urban composition. The city decided to build up the space and the entrance to the district, encouraging the creation of a new link to the shopping centre. This example shows how transport space shapes road infrastructure for a better quality of city life, by its very nature.

How is landscaping structured? How and by whom is it defined?

In transport projects, we are lucky enough to have the tramway route serving as a foundation, the backbone, if you will. It's a wonderful tool for structuring and fitting a green corridor into a scale as big as a city's, substantially bigger than that of just an avenue or district.

This assumes that the project is being put together along with the city parks director, and we exchange on what our positions make us sensitive to. In Le Mans, city parks director Loïc Peneau and I worked together to make the project coherent with the tram route's immediate and extended environment. We were on the same wavelength, so we were able to have lively but constructive discussions.

What about Brest, where you created truly structured greenery?

We did indeed plant over 3,000 trees, which Brest really needed. However, we weren't looking to develop a logical tree-based framework, but rather a way to distinguish the downtown from the districts of the city outskirts, to emphasize it. Since the downtown already had a very strong and highly structured identity, with a very green surrounding countryside, we put our bets on - concrete and grass! This relationship between concrete and greenness saturating the landscape, made us want to create something of an intermediary between the two, the idea of Nature in the city. The discussion got pretty lively, because this is not a Brest tradition, but we managed to make the City see the interest of bringing Nature into the city to set off its mineral-dominant setting. This also meant the City was setting a certain environmental example.

Considering the problematic of costs in Brest, what criteria did you use in choosing materials?

In taking into account costs and local know-how, and worksite pace on the scale of a very large downtown with a very tight schedule, there was one material in particular that made sense: concrete, because the port has a cement works and we could use very beautiful local aggregates. So concrete could be produced locally and put in place quickly, whereas granite would have been a lot more expensive; aside a few exceptions, it doesn't come from the local economy. For the most part it comes from China. It was therefore complicated to implement, and would have taken too long given the project pace. Moreover, mechanically speaking, concrete is ideal, considering what it will go through in a downtown. As for the grass, we developed a range of plants as an alternative to the traditional lawn; even better, it is permeable. Investment and operating costs are not even worth talking about, given what

it brings in terms of quality of life: a few extra euros create real quality in the urban environment. Adding greenery to the tramway routes is fundamental in creating a top level of quality of life. It generates a sense of well-being, residents turn tramway routes into real meeting-places, places of encounter. On top of this, it's undeniably ecological.

But isn't the need to water contrary to the ecological ideal?

That's true. But we are gradually emerging from the French tradition of making everything in concrete, with the concrete railway track on a natural terrain, with sealed rails on ballast. Lawn planted on a very thin layer of earth (15 cm) absolutely needs regular watering; this makes it grow faster, meaning more frequent maintenance, with equipment running on petrol. This vicious circle, hardly environmentally sound, is still very costly. Today it is replaced with a change in the structure bearing the tramway. French design offices are experimenting with this idea, new here, although it's very commonly used in Germany: there they set the rails on concrete planks, fostering permeability with the natural soil between the tracks and the rails. This is how the Tours tramway will be installed.

In what way would the «greening» of the tram tracks be setting an example environmentally?

We have launched alternative solutions like this in a few cases. In 2003, in Le Mans, we had a two-kilometre section at the end of the line in a natural area, where we planted 6000 m² of sedum, a very resistant plant used for roof cover. This had been tried in Nantes, but it hadn't worked out. We analysed why it happened; and everything followed from an in-depth substrata study and how we implemented what we learned. A platform is a vibrating plate. The vibration of the tramway causes its constituent parts to separate out: fine particles move down and pebbles move up. This means that draining clogs and the surface dries out. Further, a 70 cm thick concrete plate will really heat up and stay heated up; the rails and the concrete's ironwork act as conductors, so that any plant life cooks on a grill. We needed to use a plant able to withstand high heat without being watered. So the sedum that we selected and planted in Le Mans worked. But the crowning success of these experiments is in Brest, with over 2 km of seaside or mountain plants. They grow slowly and can be scythed, which avoids intensive maintenance and means they withstand the pull of air from the passing tramway. We therefore developed a methodology. Each time we launch a protocol of experimentation on a test site where we try out a wide range of plants that will have to adapt to the specific climatic conditions of the sites the tramway will go through.

Does the scope of the landscape architect's work create a more humanist vision of the city?

We were trained that the places we create are for people, that they are about being lived and experienced just as much as they are about being built. We sometimes forget this humanist view, but today most landscape architects design with service to Man in mind. Our profession is about creating places for people to meet, very simply, as part of their daily lives.

Vincent Cottet. Born in 1977, Vincent Cottet is a French State certified architect and landscape architect, having graduated from the Ecole Nationale Supérieure de Paysage de Versailles after his studies at the Ecole Du Breuil. He began his career alongside Thomas Richez, with the Le Mans tramway studies; he then undertook the Brest tramway project, and then that of Tours. A Richez_Associés partner since 2011, he designs projects ranging from gardens to streetscape. A few projects representative of his current work include urban integration studies for the Massy-Évry LRT, renovation of the Choisy-le-Roi downtown, the Grande-Borne public areas in Grigny, the Le Havre Grand Stade surrounding area and conversion of a Seine-Maritime industrial site in Épouville.

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URBAN DESIGN: BALANCING AESTHETICS AND FUNCTIONALITY / A CONVERSATION WITH SOVANN KIM, DESIGNER AND ARTIST, AND FRÉDÉRIC BLEROT, ARCHITECT AND PARTNER AT RICHEZ_ASSOCIÉS

Sovann Kim, you have always drawn. But how did you «fall into» street furniture and public transport?

S.K.: After graduating from the Ensci Ateliers, I did a project at Starck before spending seven years with the Wilmotte architectural firm. I was responsible there especially for the Rouen tramway project; then I was asked to design a line of street furniture and fixtures for Hess, to design the layout and the furniture - benches, lamps, train track ventilation grates, etc. - down to the smallest detail. Then after having created my own design workshop in 1999, I started going in the «urban direction», with my heart set on bringing something more to users.

With your concern for the user, you could have decided just as well to design pots and pans, or cars. Why street furniture?

S.K.: I like the idea of street furniture being available to everyone, all social classes combined. I am attracted to the notion of everyone sharing and having access. Whether benches, pergolas, bus shelters, lamps, whatever, street furniture is there to serve the user, to whom we give greater consideration today.

Frédéric Blerot: Even recently, putting up public facilities such as media libraries or museums meant mayors could talk about their cities, while these buildings target only a limited group of users. On the other hand, redoing the road network affects everyone since the public space belongs to all. This is why, for some years now, mayors are redeveloping public areas to benefit pedestrians. This means that street furniture, formerly highly standardized and purely functional, has completely changed. Certain cities have taken this initiative: Paris designed their aribus bus shelters, Lyon developed an urban charter for their streetlamps, furniture and fixtures. Some architectural firms, Wilmotte in particular, had some interesting approaches. This caused manufacturers to come up with furniture catalogues with product lines especially adapted to cities,

which were very hungry for personalized, identity-creating concepts. A tramway project now, and the scale it develops, is a chance to imagine something different for furniture or surfacing.

Is there really such a wide choice of furniture?

FB.: Yes. Even too wide. We need to step back and take a big-picture look at the city to create a «furniture and surfacing» charter. A charter which, it seems to me, should take both identity and maintenance into consideration. In Paris for example, public spaces are essentially designed around a wide border in granite, asphalt on the pavements and brown street furniture. But I can count on one hand the number of cities who have established this kind of charter. It's a shame that technical services are not more interested in it, because this plays a part in sustainable development. I've even heard suggestions that each road, each square have its own furniture and surfacing, under the pretext that each road, each square, had a different name! I don't dare imagine the maintenance problems that such a lack of coherency would cause, not to speak of the lack of identity for these public spaces.

S.K.: I work regularly for street furniture and streetlamp manufacturers looking to broaden their catalogues. And I do see that today there is real initiative in thinking about the meaning of urban design with the user in mind, with a contemporary approach. Certain cities are seeking a real quality-of-life for themselves, and a rather strong sense of identity.

What drives a city to call on a designer? Is it for marketing reasons, for a tool to create a new vision of the city? To personalize a transport line's identity? To find a way for users to make the tramway their own, to appropriate it for themselves?

S.K.: Undoubtedly, it's all of that at the same time. Architects and engineers like Hittorf, Alphand or Guimard brought about major developments in the history of urban design. They were virtuosos at reordering their cities while designing marvellous furniture, fountains and street-lamps. It was part of a whole, an overall vision. Then came a period in which design was somewhat forgotten. Today there is a returning desire for well thought-out and well-designed urban objects.

Who commissions them? The public authorities or technical services?

FB.: For the most part the contractors propose it, making the public authorities aware of how pertinent this approach is.

S.K.: But sometimes elected officials also take this kind of initiative; I'm thinking in particular of the Maréchaux tramway for which the City of Paris and the RATP jointly launched a competition to design the entire line of station furniture.

Brest also launched a design competition, it seems to me.

FB.: Yes. Bordeaux as well, with Elizabeth de Portzamparc. But for the

most part, it's the architects who put this idea forward. When we bring up design of the line and furniture, virtually no one has given it a second thought. The project managers had thought about the TCSP route, the technical problems, changes in circulation and the infrastructures to be built. But they hadn't thought about the station furniture, which they prefer to buy from so-called catalogues. And yet - I want to insist on how important this is - the station is the entrance to public transport, it's where you buy your ticket, get your information, where you wait and where you get on the train. It really is a dedicated area in the public space. It's important to personalize this special moment. Richez Associés has always sought, in all its transport projects, to develop stations with a special identity, congruent with that of its city.

Sovann Kim, Frédéric Blerot, what have you worked on together?

S.K.: Reims and the Line 2 in Orléans, where I was one of the partners in the project management group.

FB.: We have also taken part in tramway competitions, for example the ones for Le Mans, Dijon and Luxembourg. But I have to emphasize that it's very rare, in this type of consultation, that design is specified as part of the overall contractor responsibility. As such, recently in Liège we convinced the client to make a call to tenders for a couple of designers for the station furniture and rolling stock.

How much does such a project cost?

FB.: A tramway project has the kind of budget that means developing furniture especially for it is a negligible cost. After calculation, the extra expense comes to about 0.1% of the overall cost of work as compared to catalogue furniture. In other words, for this amount the city can have its own furniture. You have minimal expenditure for maximum results, maximum impact.

S.K.: A transport system like a tramway, i.e. a line about 15 km long, 20 stations and platforms over 40 m long, should systematically have its own street furniture. After all, these installations will be in the public space for a long time. Contractors and cities are beginning to realize this. Meaningful, coherent furniture needs to be created so it doesn't just turn into long-lasting visual pollution.

Can we say that design lies between gratuitous aesthetics and pure functionality? How can we recognize a «good» design and product?

S.K.: In the project process, it's exploration of an idea that counts for me. For the Reims tramway shelters, we wanted to evoke stained glass right in the middle of the station. You're not working on a form, but on an idea; in short it's rather abstract at first, since it involves light and colours. Each detail has to serve the final purpose, with nothing superfluous. You're continually seeking to balance presence and absence.

FB.: Good furniture is first of all functional, with its maintenance pro-

perly studied. Only then come the aesthetics, handled with discretion. It's a delicate thing, balancing presence and absence: it means that the furniture is never intrusive or aggressive in appearance. It's there when we look at it, but it can also disappear if we don't want to look at it. This is what we did in Reims. The furniture is there: by day, its discrete presence melts into the city, while the colourful trains run between it; at night, it explodes with colour, like the Cathedral's stained glass.

S.K.: It's surprising and luminous, very attractive in the evening and to the user; the restrained design leaves the viewer free to interpret the pattern and make the furniture his own.

FB.: This is what good design is about, just like good architecture or good city planning: it's timeless, beyond fashion and pretentiousness; it's functional, elegant and discrete, and like the projects we do at Richez Associés.

Where does the boundary lie between designer and artist?

S.K.: It's difficult to say. My design work concerns the urban space and public transport, but I am just as implicated in the contemporary art world. My artistic work, represented by the Catherine Putman Gallery in Paris, is somewhere between drawing, printmaking, photography and digital exploration. I'm especially interested in the creative process when it heads for experimentation and the unknown.

While you have design and purely artistic work, certain projects permit the two realms to overlap. Finding a way for them to function together, creating interferences - this is perhaps what interests Frédéric, and more generally Richez Associés. It is undoubtedly the reason why we've worked together for so long. The Reims project is a good demonstration: the rooftop of lights can also be interpreted as a kind of painting. In the same way, the streetlights that I design for certain manufacturers - Valmont or GHM-Eclatec - start often from the idea of a sculpture set on a post 6 or 7 m tall.

What about the second tramway line in Orléans?

S.K.: Right from the start, the budget didn't allow for a full design project. So we concentrated on certain objects, especially technical cabinets housing static and dynamic information, ticket distributing machines, power cabinets, etc. For this I proposed my «lighthouse» idea: an opaque block topped with a box of light. We were also asked to design shelters especially for multimodal stations, as well as major design work for OCL poles, which are very technical. The rest of the furniture was chosen from the catalogue, and especially from Aréa, because of their products' elegance and timelessness.

FB.: There again, I would like to insist on the fact that buying from the catalogue does not mean you save a lot of money. There are perhaps a few thousand euros of difference, but on the scale of such a project, the amount is pathetically small.

How do you work together on the project management team?

FB.: In Reims, as the architect and in connection with the station studies, I faced the operating problematic, cable outlet technical questions, OCL supporting poles issues. On the other hand, the platform gave us a chance to be more poetic, with a 40-meter base serving as a setting for furniture. Our role is therefore to be an interface between the technical world and the poetry the designer wants to express.

S.K.: Like Frédéric, I'm very involved in the functional or technical issues, debates on rules of accessibility or maintenance. I participate in the meetings with system engineers, the network operator, design offices, architects and landscapers. The idea gradually becomes a project, and then takes form with everyone's constraints being taken into account - but with the poetry of the original idea preserved.

FB.: Their project is ours and ours theirs.

Artist and designer, **Sovann Kim**, born in Cambodia, came to France in 1975 at the age of nine. After studying fine arts at the Saint-Charles faculty in Paris, he attended the Ateliers of the Ecole Nationale Supérieure de Création Industrielle. Today he juggles his professional work as a street furniture designer, part of which involves public transport; and his artistic research, supported by the Catherine Putman Gallery in Paris.

Frédéric Blerot. Born in Reims in 1970, Frédéric Blerot graduated from the Ecole Nationale Supérieure d'Architecture de Paris-Belleville. A Richez_Associés partner since 2009, firm head since 2004 and with 15 years of practice behind him, he leads projects in the realms of architecture, public space development, city planning and transport in France and worldwide (Belgium, Morocco, Mexico, etc.). His projects have included the Reims, Liège and Casablanca tramways, maintenance depots for Evry Sénart and Blois, streetscape of downtown Calais, extension of the Parisian Metro line 11 and the Notre-Dame-de-Gravenchon urban development area.

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LE MANS : THE TRAM AS THE CITY'S GOVERNING PRINCIPLE COHERENCY & CLARITY

City

Le Mans is known internationally for its 24-hour car race, and known in France for its mutual funds, a major local employer. Fundamentally, however, the city is modest and industrious in spirit - "guys from Le Mans" never try to compete with "gentlemen from Tours".

The town is defined by the confluence of the Sarthe and the Huisne, and the hill where stands the completely preserved old Roman and medieval city, known as the «Cité Plantagenet». Convents have long dotted the districts around the centre. In the 19th century, the coming of the railroad brought a star-shaped railroad network with four branches, together with the development of railway industries.

During World War II, the city's location was ideal for the Renault factories to set up here.

At a time when Baron Haussmann's influence was transforming cities and opening grand avenues, Le Mans was content with a single boulevard extending from the train station to close to the town centre, which had moved from the hill in the 19th century. This boulevard is not linked to the tunnel running through that hill. A major opening was begun in the 1970s, then connected to the tunnel in the 1980s, but most of the centre, crisscrossed with narrow streets and built on a human scale, remains unchanged, dominated by a few buildings, towers and apartment blocks.

Issues

Neither the 19th century nor the 20th gave Le Mans a coherent, complete network of avenues. The few openings made here and there were not enough to create a clear, simple route to the downtown. Le Mans is a town of houses with a complex, rather incomprehensible rail network, organized by no main route to structure the city; it also has a collection of very simple, rather residential architecture.

Even though tramway studies were well underway, the French State decided in 2003 to drop its financial support from €42 million to €8 million. The preliminary project was therefore completely reviewed, which is what eventually led to making the Le Mans tramway France's least expensive: €302 million, all tax included, for a line 15 km long.

Engagement

- A new traffic plan clarifies vehicle access to the centre and parks, and greatly extends the pedestrian areas.

- The materials are simple, without being ostentatious or superfluous, in a spirit similar to that of the city's residents themselves, but precisely designed, with bright-coloured coherency.

- The concrete slabs and ochre-coloured exposed aggregate concrete are used in busy pedestrian walkways, with moderate use of granite in

the most important locations.

- The platform was grassed along 80% of its length, edged by a low pale-ochre granite barrier to evoke Le Mans' Roman wall.

- Street furniture - chestnut brown with a metallic finish, set off with touches of red - completed the range of installations put in place throughout Le Mans.

- The orange-coloured trains quickly became very much emblematic of the network, recalling the late Roman Empire walls surrounding the Cité Plantagenet.

Results

The railway's narrow width means the tramway has a very imposing presence, and appropriates the streets. Despite a modest budget, highly visible solutions were found at extremely reasonable costs.

The tramway is now the common thread running through the town, structuring, unifying, creating new, elegant, coherent spaces. Fostering greater clarity, the Le Mans tramway is truly the guiding principle, bringing transformation to the town's geography and image. It constitutes a real landmark and a reference point, the town's first.

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URBAN RECONSTRUCTION / ENCOUNTER WITH DIDIER BAHIN, MANAGING DIRECTOR OF SERVICES FOR THE CITY OF LE MANS AND THE LE MANS MÉTROPOLE URBAN AREA COMMUNITY COUNCIL

How is Le Mans laid out?

First of all, Le Mans is a city comprised principally of workers and employees. It is a modest town, which does not build 19th-century style «bourgeois» buildings. This partly explains its city planning. The arrival of the railroad, which opened Le Mans up westward and to Brittany, transformed the city in the mid-19th century. It went from 45,000 to 100,000 inhabitants and soon supported a substantial railway industry - which especially included railway carriage construction. In the interwar period, its location was ideal for both insurance companies and the Renault factories. Employment drew country folk from the surrounding area who came to work in these companies, while the aristocracy remained on its land. There wasn't much of an upper middle class. So much so, that in the 19th century, when cities were transforming themselves with grand avenues, Le Mans limited itself to a single boulevard from the train station to Place des Jacobins, in the historic town centre. It was only much later, between 1972 and the 1990s, that the city rebuilt itself around a central road that radically changed the downtown; logical city planning replaced the small streets and old buildings, an operation allowing for no urban renovation, similar to what happened in priority development areas in the 1960s. But Le Mans does have some very beautiful townhouses and a magnificent early grouping of 15th to 16th century buildings in the Cité Plantagenet.

How are the city and metropolitan area organized politically?

From 1977, after having been governed for 20 years by rightists, Le Mans was run by a communist mayor, Robert Jarry, who made an alliance with the Socialist Party. He had community centres and media libraries built for the city during his term of office. Then came major change in 2001: Jean-Claude Boulard, president of the urban area community council, was elected mayor. The city wanted to change its image, to leave the world-renowned 24 Heures du Mans car race and rillettes behind. We are therefore doing everything to open up the city's cultural and economic life, especially through the great many historic films shot in the Cité Plantagenêt.

What are you relying on to change Le Mans' image?

Historically speaking Le Mans is a city of movement, owing to the railway and automobile industries here. We have mechanical know-how here. For this reason, Le Mans has an even stronger tie to transport, since it is the second city, after Lyon, to be served by the TGV high-speed train. To the contrary of Amiens, the municipality, metropolitan area and the administrative département opposed SNCF engineering logic; they wanted to build the station in the city rather than out in the countryside. We are today developing the Novaxis business district south of the train station, around the former psychiatric hospital. Thanks to the TGV, Paris is less than an hour away and we have a direct link to Roissy and the world, and all the big European cities. This is a major argument for manufacturers and entrepreneurs.

Why choose a tramway for transport?

In the early 1990s, Le Mans had a bus system that was working very well. But public areas were handled in a rather rural way, with a single pedestrian street and roundabouts on major squares; the 19th-century road network made a place for cars - in terms of both circulation and parking - but with no particularly organized development. In 1994, when I was City Planning Director, I proposed an urban development plan to Mayor Robert Jarry and to Jean-Claude Boulard, then president of the urban area community council. Its guiding principle was that of a segregated-lane public transport project. We didn't talk about tramways. At the time, only Nantes had considered them. For a city like ours, it was beyond our budget, especially since prior engineering studies had shown it to be of little interest. Unless - and this was my argument - unless it gave us a chance to redesign our city.

Le Mans tramway was therefore spearheading a city reconstruction project?

Indeed. At the start, this segregated-lane public transport project was called «Dessine-moi ma ville» («Design My City»). And then as the studies advanced the idea of the tramway emerged, despite our very tight budget. In 1999 and 2000, while we were getting ready for the municipal elections, we launched a consultation with images of the projected tramway in place. This was argument number one for then-candidate

Boulard: remake the city. We didn't know yet what the tramway would look like, if it would be running on iron wheels or on tyres, and the first meeting was difficult. But the twenty subsequent ones went extremely well: the idea of re-conquering the public space, linked to reconstruction of the train station and its square by the SNCF (Jean-Marie Duthilleul), was well received.

How did you come to work with Thomas Richez?

I met him on the train station underpass project and a transport feasibility study. A decade later, when we launched the tramway's call for tenders, Thomas had the advantage of knowing the city well and offering pertinent solutions. That's why we gave him the project. Thomas really listened to us, and listened a lot. We also were fully mobilized to find solutions to the great many issues the tramway raised and to how we were going to transform the city. In the end, with our modest understanding of the issue, we showed what could be achieved, with drawings and additional information - because the budget was voluntarily tight. To my mind it's the best way to run a project, because you're forced to make choices.

It is generally known that the Le Mans tramway is the least expensive in France. Where did the project save money?

Just because we had to make clear decisions didn't mean we held the project back: we reconstructed squares, we retrofitted streets, all while we were thinking about what materials we wanted, what street furniture. The idea that every euro had to really count forced us to optimize the project, to get a handle on costs while being very demanding about the quality of life we were bringing to the city.

What were your main choices regarding the streetscape?

We decided on a streetscape that was coherent, consisting for the most part of exposed aggregate concrete slabs, and granite from time to time on downtown squares or size limit barriers. Everything was designed down to the last detail; we laid it out very precisely façade to façade. We decided - and this was a real political choice - to make all the stations uniform, no matter their district. We also decided on grassing, to have a green tramway with greenery. We aimed to give unity to the city, which had grown every which way as the suburbs were added on. To affirm the city's proactive policy, we decided to make the new element linking the city a visible one. This is why the paint scheme is brick red, to recall our Roman wall. Le Mans residents feel that the entire city has benefited from being unified by this common theme.

What technical choices did you decide to make and why?

Once the tramway was decided on, we organized a meeting, in 2002, with the cities of Nancy, Orléans, Clermont-Ferrand and Caen. We wanted to get their feedback on their experience and to get their help in choosing between iron wheels or tyres. At the time Bombardier was

explaining to anyone who would listen that he could make a cheap, easily-maintained tyre tramway. For my part, I stubbornly defended the iron-wheel tramway.

Why? The tyre tramway is advantageous because it handles like a road vehicle, contrary to an iron-wheel tramway, which is totally rigid.

It's a question of being pragmatic. Just as community centre halls are good for everything but are great for nothing, an iron-wheel tramway is not a real tramway; it has limited capacity to work with the road gauge, it doesn't have a segregated lane, and not having its own site means it leaves the central rail at the slightest occasion. In the end this produced the catastrophic situation in Nancy. The second disadvantage is concrete slabs need to be made to avoid rutting, which increases the cost considerably.

Iron-wheel tramways have the one disadvantage of not being able to leave their route. On the other hand, there is the great advantage of the tramway running on its own path, one that can be personalized, such as with the greenery as here; it's a chance to rethink the city. Not only was that our purpose; we also didn't have any room for error. You don't choose a prototype, you choose something with a proven history. Yet the Bordeaux tramway had had major electrical technical problems and was more expensive. This is why I was reluctant about ground power supply. Our challenge was to meet the schedule at the agreed-upon price to finish with a functioning means of transport.

What obstacles or constraints did you face?

Fear of change and cost. From residents and businesses. On the first issue we organized a consultation on the city project theme. We were working in partnership with the CCI and had meetings. Often! And with all the strength of our convictions. On the second issue, we set up an ad hoc claims commission. And we convinced them.

And then we had something major and unexpected come up: the French State, which had granted us €42 million, changed its mind and decided to no longer finance anything. After a lot of strong discussion, we got €8 million. But we had to find ways to reduce costs. We put the project on the table and took a second look at every expenditure. We shortened the platforms to the strictly necessary 30 m, while keeping the option of extending them later. We eliminated a station at the end of the line which eliminated any future extension. Each step we took was validated only if there were other reasons for doing it other than simply reducing the bill.

Are you today an example for other cities? Which ones? And in what regard?

The fact that Le Mans has the cheapest tramway in France, has been honoured as Best Segregated-Lane Tramway in 2007, and that we are the smallest city in France to get equipment like this, all has necessarily drawn attention. A great many municipalities in France (including veterans like Grenoble), Europe (especially Scandinavia) but also world-

wide (China, the South Pacific) have come to take a look. What has caught their attention and aroused their curiosity has been, in particular, our city project approach. Our visitors wanted especially to know how, while complying with a reasonable budget, it was possible to develop a real urban reconstruction project combining mobility, city planning and urban design.

How have the inhabitants of Le Mans reacted to the tram?

It's their tram. The tram has made them proud of their city. And it is in this that we changed it. The tramway is a wonderful way to reconquer public spaces and transform the city, which went from the 19th to the 21st century in a few years. The transportation project has grown into an urban project, and the tram has been a vehicle for modernity.

One word to summarize the Le Mans tramway?

Catalyst.

Born in 1955, **Didier Bahin** graduated from the Ecole Nationale d'Architecture de Nancy. A great admirer of Le Corbusier and the Bauhaus, he began his career by creating his own Nancy agency. Early on he became aware of his passion for building the city, in as much as in 1982 the French decentralization began. He then moved to Clermont-Ferrand City Services, where he stayed for over nine years. In February 1993, he came to Le Mans where he directed City Planning, then Urban Development. He became Managing Director of the Le Mans Métropole urban area community council in April 1999, then, in 2008, he was also appointed Managing Director of City Services.

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AVENUE DURAND

Avenue Durand leads into the city from the south; it extends the road that for 24 hours every year becomes the famous Ligne Droite des Hunaudières straightaway. The coming of the tramway transformed this suburban avenue near the trunk road; an underpass approach from the 1970s and a multi-level interchange were eliminated. The tramway is central, on the grass carpet framed by two reduced-traffic roads, cycling paths and a shaded parking area. The avenue's disparate surrounding buildings seem repositioned and orderly owing to the public space, which is simple, yet feels designed and cadenced. Five stations, consisting of wide central platforms, stage the perspective over the Le Mans old town and surrounding countryside.

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PLACE DE LA RÉPUBLIQUE

Traffic was dense on Place de la République. Pedestrians had to take underground passageways to reach the commercial area which was buried under the square and created an unpleasant bulge in the centre.

The arrival of the tramway permitted rebuilding there, creating a single entrance to the car park via an underpass away from the square; better levelling was also possible, as well as the addition of a great expanse of ochre granite, marked by monumental steel masts. At nightfall, they send precise threads of red light toward the large sidewalk cafés, which very quickly developed.

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SAINT-MARTIN

Saint-Martin station is just before the fork in Line 1, meaning it gets twice as many trams. Bus lines serving the southern side of the city connect to the tramway here, and its two lines run closely around the bus area for a «platform-to-platform» bus/tramway transfer. The draw of this transport system could make it central in the city: the space freed up by destruction of the interchange that was there could later be used for an ambitious urban development project in an area with very complete transport connections.

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CALENDAR

1992: inception study

1994: scoping study

1997: design study

1999: joint efforts

2001: selection of the iron

2002: selection of the project management team

2003: preliminary design

2004: project and networks repositioning

2005: tenders and early tram works

2006-2007: construction

November 2007: start-up

DATA

Client: Société d'Équipement du Mans, for Le Mans Métropole

Project management: Egis-Rail + Artelia Ville et Transport + Egis-Aménagement + Richez_Associés + Attica

Richez_Associés' team: Thomas Richez + Vincent Cottet + Michel García de las Bayonas + Virginie Anselme + Aurélie Farret + Isabelle Werner + Éric Prigent + Pauline Courtier + Isabelle Moulin + Silvère Levy + Mario Galli + Elisabetta Rimoldi + Nicolas Coutelin + Vincent Chanson + Élise Arnoux + Carla Manfredi + Matteo Ponis + Mathieu Voisin

Furniture: Sovann Kim

Photos credits: Cyrille Dubreuil + Didier Pruvot

FIGURES

A forked line 15.4 km in length

29 stations

23 trains

Cost: 302 million Euros, including:

Studies: 13 million Euros

Urban development including roads: 103 million Euros

Underground infrastructures: 33 million Euros

Electrical power supply: 16 million Euros

Rolling stock: 55 million Euros

Railway signage: 2 million Euros

Tracks and track equipment: 25 million Euros

Operating system: 22 million Euros

Communication and start-up: 2 million Euros

Maintenance centre: 18 million Euros

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REIMS : THE PEACEFUL TRAM REVOLUTION PRIDE & MAJESTY

City

Reims, the champagne city, as a historical aura to it: it was a major Roman city, before becoming France's City of Coronations. The quality of its city centre, very successfully rebuilt after World War I, nevertheless hides substantial recent urban development including vast extents of 1960s social housing. The surrounding vineyards limit Reims' growth, making it one of France's densest cities, served by a very busy bus network.

The city's neighbourhoods are aerated, dotted with squares and green areas. The downtown has a wealth of stone architecture and Art Deco facades, urban spaces reflecting those of the Gallo-Roman city, with its cardo and decumanus. On the outskirts, early 20th century garden-projects and fine parks are another form of heritage deserving respect and enhancement.

Issues

A first tramway project, supported in 1984 by Jean-Louis Schneiter, then deputy mayor, was abandoned by mayor Jean Falala's decision, as he faced opposition in the city centre. In 2001, with the TGV's arrival and the risk of the bus network saturating, the same Jean-Louis Schneiter, then mayor, launched the project again. Three objectives gave a framework to the studies: they sought to open up, reconcile and beautify. The tram line runs north-south to serve the major suburbs, the central train station, downtown, hospital and TGV train station. There was delicate moment during the route definition studies: the Cours Langlet - the Champs-Élysées of Reims, on which the first project had been blocked - is the choke point in the city centre. But the tramway project carried the day: since 1984 other cities have proven the potential of this type of project for cities. In the specific case of Reims, detailed work was carried out right from the preliminary project in conjunction with the

installation of several 4 x 3 m photorealistic perspectives placed throughout the city to serve as a convincing demonstration. The tram would be the first launched as part of a genuine concession, combining creation of the tramway line with an urban development project and operation of the tram + bus public transport network through a public-private partnership.

Engagement

- In a city with a highly architected downtown, impact: sophisticated stations and furniture: granite slabs for platform edges, shelters designed by Kim Sovann, a special street furniture collection: very graphic, black protective posts, barriers, tree guards and bicycle racks.
- 60% of the platform is grassed, reinforcing the city's greenness, including the Cours Langlet near the cathedral east end.
- The ground power supply system (GPS) has been implemented in the most beautiful areas of the downtown, from Boulingrin station to Comédie.
- The front end of the tramway recalls a champagne flute.
- Lighting for the stations accompanies the range of seven bright colours Ruedi Baur developed for the trams.

Results

The tramway runs quite naturally through the open, airy, well laid-out spaces of the city. The fluidity of its itinerary, in a space returned to pedestrians and non-motorized transport, binds them together in a way to be experienced and subtly felt; this very much brings out the city's special characteristic of wide, continuous extents of space, bare of the medieval.

The new contractual concession/public-private partnerships framework changes how the project manager proceeds, to work very early on with the company handling the work. This way of functioning ensures project conditions, but it can also limit the architect's freedom and creativity. It will take several experiences to be able to properly draw conclusions about this way of proceeding.

Ground power supply seems particularly suited to the historic areas requiring a complex route, one fully under technical control.

The extensive work on the station as well as the linking of the rolling stock and shelter are a big step forward, one to be taken as an example for other projects.

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CREATING A SENSE OF CONTINUITY / ENCOUNTER WITH CHRISTIAN MESSELYN, PRESIDENT OF MARS, (MOBILITÉ AGGLOMÉRATION RÉMOISE, OR REIMS METROPOLITAN AREA MOBILITY) / VICE PRESIDENT TRANSPORT GLOBAL SOLUTIONS STRATEGY & CONCESSIONS FOR ALSTOM

How would you define Reims?

Reims is a piecemeal city functioning by district: it has a north/south se-

paration because of the railroad, and an east/west separation because of the A4 motorway, the Vesle River and the Canal de l'Aisne à la Marne running right in the middle. These two big breaks, as can be imagined, don't encourage communication between the four quarters of the city any more than they do between the different islands of activities. It's therefore important to re-establish flow between all these districts.

Reims has an especially well-developed bus transport network. Why choose to have another means of transport?

A great many of the bus lines were saturated. As for the tramway, it's part of the city restructuring and development, creating a sense of continuity between the two completely opposite poles: the historic old town and shopping centre and the welfare housing (60%), built in the 1970s, very dense and undergoing complete restructuring.

We're talking about a first tramway line. Definition of this first line's route is based on what principles?

The Reims Métropole transportation services were mandated to study the route before MARS got involved. Political and technical choices determined the route. I add that before the call to tender for the works contract was launched, the project had been presented to residents at 70 consultative meetings conducted by the Metropolitan Area.

What were the priorities?

Since it's a transport project, the tramway corridor corresponds to the bus lines most frequented and undergoing saturation. Given that it was also question of reconfiguring the urban space, the Metropolitan Area, in consultation with residents, determined the streets in which it was more coherent to run the tramway to maximize impact on reorganization of the town. Ultimately, this more or less corresponds to the major draws in the city: the university, hospitals, schools, the two train stations, the rather dense residential districts and the downtown shopping area.

What makes your way of proceeding with the Reims tramway unique?

The big reason this project is unique is because of how the works contract is put together, which was a first in France for an urban transport network. In July 2006, the City and the Metropolitan Area had not only conceded design, construction and financing for the tramway to MARS for 34 1/2 years in connection with the public-private partnership (PPP), but also operation of the existing transport network, which included reconfiguration of the bus lines. In this regard, MARS is comparable to the Parisian RATP as regards the Île-de-France transport authority, the Syndicat des Transports de l'Île-de-France.

With the slight difference that MARS is a private company...

Yes. MARS was founded to have the Reims works contract carried out by the project's major players: the rolling stock manufacture and system provider (Alstom Transport), the companies carrying out the works

(Colas, Bouygues and their subsidiaries), the operator (Veolia Transdev), the concern handling engineering and project management (SNC-Lavalin), and private financial entities (the Caisse des Dépôts Infrastructures, the Caisse d'Épargne Lorraine Champagne-Ardenne, Natixis Environnement et Infrastructures). MARS was therefore the contracting authority for this operation.

What was the interest in proceeding this way?

From their point of view, of everything envisaged, it was this that made it possible to both respond to user needs the most quickly while having a handle on the risks of interface between bus network operation and tramway works. At the conclusion of the contract, over 30 years, all the initial investments will have been amortized and MARS will deliver the entire transportation system (tramway, infrastructures, depot) over to the Metropolitan Area at no cost. Reims Métropole can then launch a new call for tenders for the works contract. And we will resell the bus fleet at its residual value to the next operator. The personnel working for Veolia Transdev on network operation will be transferred, in accordance with French employment law, to the following operator.

This first tramway line concerns only the city of Reims, except for a few stations falling under the Metropolitan Area. How has authority been organized?

The organizing transport authority is Reims Métropole, no matter the municipality concerned by the infrastructure. There is an agreement by which the City authorized the Metropolitan Area to install community equipment on its terrain.

You've chosen two means of power supply for the tramway. What are the reasons and what is the feedback on these two methods?

Originally it was the architect from Bâtiments de France (France's national heritage watchdog) that didn't want an overhead contact line in the historic centre near the Cathedral. This requirement meant there were several options: either using a battery, or choosing ground power supply only along the 400 m corresponding to the Cathedral's cone of visibility. We proposed extending the ground power supply to 2 km to include Place de la République, the walkways in front of the train station and the pedestrian centre.

Feedback is very good, since this has meant we could avoid all the public inquiry red tape for anchoring on façades in this protected area, network deviations and, ultimately, we got a much simpler worksite than with an overhead contact line.

Simpler to do, but more expensive?

Just slightly, over a period of 30 years. When the added investment is compared to operating and maintenance costs for both solutions, the difference is very slight. But above all, with technical performance the same for both means, ground power supply is a lot simpler, a lot more

aesthetic and a lot more flexible for seeing to the everyday tasks of city life, such as tree pruning, deliveries, the work of the fire department or putting up Christmas decorations.

Why and how did you choose the two designers?

Residents were invited to participate in personalizing their tramway through consultations on the rolling stock design (choice of tramway colors and the shape of its front). The majority of votes were for Franco-Swiss designer Ruedi Baur's proposal; he developed a charter of eight acid colors for the trams and buses. The MBD Design agency created the tram nose, recalling a champagne flute. As for street and station furniture, which was our responsibility, we launched a design competition to extend Ruedi Baur's artistic concept, carried out by the Metropolitan Area in such a way that there was real coherency between the colorful setting of the infrastructure and the street furniture Sovann Kim designed.

Does Alstom employ designers for its rolling stock?

Alstom considers the rolling stock has to reflect the city's image. This is why the principal characteristic of Citadis equipment is that of being very easily used and enjoyed. This Alstom tramway range came into being in the late 1990s. The first were installed in Montpellier, in Lyon and in Orléans at the start of the years 2000. By now over 1,500 have been produced and will soon be crisscrossing the streets of Brest, Dijon and Aubagne, and so on.

How has the urban reorganization been put together?

The Richez_Associés and Egis Aménagement (the former Atelier Villes et Paysages) proposal was approved by the City and the Metropolitan Area. Development of the detailed preliminary project was an interesting period of discussion. Our involvement concerned the city territory but the works that we carried out on the rights-of-way that weren't affected by the structure gauge were submitted to the city of Reims, the year after starting the service maintaining them.

One word to symbolize the Reims tramway?

Integration. Because it's a project that makes it possible to link up districts, because our way of proceeding has integrated the tramway appearance and urban restructuring, because the team that did it was fully integrated and finally, because the result is fully integrated into the city to the point of being something that goes without saying today for residents.

Christian Messelyn was born in Lille in June 1970, graduated from Supélec in 1993, was President of MARS from June 2006 to March 2012, and is currently Vice President of Alstom Transport, responsible for works contracts and turnkey projects strategy; he is also Chairman of the MARS Board of Directors.

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COURS LANGLET

Designed as part of the post-war Reconstruction after World War II, and aligned with the Cathedral's north tower, Cours Langlet is emblematic of the downtown. The tramway extends a wide carpet of greenery there, exceptional in the downtown's heart. It is enhanced with low flowering trees. At the foot of the very beautiful façades, a plateau of natural stone welcomes pedestrians and vehicles in a 30 km zone. The electric substation is of course buried underground.

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PEM GARE

Major work on the station: an automobile underpass eliminates inter-district traffic, and creates the stretch of a pedestrian area that had been missing between the station and downtown, through the Promenades, the tramway station, and the historic Square Colbert; the wrought-iron fencing disappears, and the view from the station opens on the Cours d'Erlont and its café terraces. The station gains a wide plaza in pale granite. It has no marked separation for automobile traffic or parking; when trains arrive, both pedestrians and parked cars calmly share the space. Within minutes all the vehicles are gone, leaving the plaza surface impeccable and empty.

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SAINT-JOHN-PERSE

The tramway route runs along Parc Saint-John-Perse, designed by Jacques Simon in 1973 for the "Croix-Rouge" district. It takes one of the roads of the former two two-lane roads, converted into a reserved bus lane a few years before. The tram space is handled using the park's vocabulary: the platform is green with saplings pruned to form shrubbery, planted in rolling lawn...to the point that the park seems to engulf the tramway.

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CALENDAR

2002-2004: initial studies

July 2005: preliminary design

July 2006: concession to build and operate

September 2006 - March 2008: project studies

2009-2010: construction

April 2011: start-up

DATA

Client: MARS (Alstom Transport + Bouygues + SNC Lavalin + Pingat Ingénierie + Groupe Transdev + Caisse d'Épargne Lorraine Champagne-Ardenne + Natixis + Caisse des Dépôts), concession-holder for the Reims metropolitan area community council.

Project management: SNC Lavalin + Pingat Ingénierie + Richez Associés + Atelier Villes et Paysages

Richez Associés' team: Frédéric Blerot + Thomas Richez + Bertrand Dubus + Aurélie Farret + Pauline Courtier + Romain Fournerie + Miguel Rivas Mansuy + Rudy Blanc + Guillaume Chabenat + Cécile Raigondeau + Mario Galli + Karine Clément + David Weisz + Deborah De Donato + Inès Lestang + Margaux Vannini + Sylvain Eymard-Duvernay + David Blavy + Alexandre Piquel

Station design + furniture: Sovann Kim

Artist: Christian Lapie

Photos credits: Michel Jolyot

FIGURES

2 forked lines 11.2 km in length

23 stations

18 trains

Cost: 283 million Euros, including:

Project management and studies: 30.4 million Euros

Preliminary works: 20.8 million Euros

Tramway platform: 16 million Euros

Pedestrian walkway: 12.5 million Euros

Pavements and cycling paths: 15.3 million Euros

Car parks and ground-level park and ride lots: 3.6 million Euros

Urban street furniture: 7.8 million Euros

Signage sequencing: 0.4 million Euros

Police directional signalling: 1.9 million Euros

Planting: 3.6 million Euros

Works: 15.4 million Euros

Tramway stations: 2.6 million Euros

Technical facilities: 1.8 million Euros

Electromechanical equipment: 67.3 million Euros

Rolling stock: 44.5 million Euros

Depot workshop: 25 million Euros

Bus stops: 4.2 million Euros

Storm water drainage: 10.4 million Euros

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ORLÉANS : A TRAM WITH A WINDOW ON HISTORY

ELEGANCE & CLARITY

City

Orléans, first a Roman, then a royal city, was long rival to Paris: under the Capetians, it was the kingdom's capital before that honour fell to Paris in the late eleventh century. The city was built on the Loire's right bank, safe from flooding. It developed along the river, where it could be easily crossed, and around the port, good-sized from Roman times to the mid-nineteenth century.

Its fortifications were extended several times until 1555; they then gave place in the early nineteenth century to a network of walkways: the avenues today define the centre of a dynamic metropolitan area, greatly enjoying the advantage of Paris' nearness, and a web of business activities driven by the «Cosmetic Valley.»

Traces from several periods summarise the city's history in its centre: construction of Rue Jeanne d'Arc, leading straight to the cathedral, was definitively finished in 1846. Its Neoclassicism resurrects the Roman city's decumanus; it passes through the medieval traces remaining today; following the major destruction of World War II, a few post-war "Reconstruction" Modernist buildings stand in the city centre.

The city also experienced the same post-war extension that all French cities did, with its big districts of housing and open-handed city planning, and the development of the metropolitan area that absorbed the former neighbouring towns.

The first tram line, north-south, was inaugurated in 2000; it also brought the downfall of the municipal majority: after having campaigned against the project for a second tramway supported by the outgoing team, Serge Grouard succeeded Jean-Pierre Sueur as mayor of Orléans.

After several years of study, including on alternative means of transport, the Orléans metropolitan area launched the second line, having opted for a rail system. Shorter than the first project, it runs east to west, crossing the city centre by Rue Jeanne d'Arc.

Issues

Like the Loire, the second line therefore joins together five very different municipalities, and travels through contrasting urban contexts. As the city's second line, it arouses less concern than the first, but creates greater expectations: elected officials are very attentive to the expected quality of the development, its meaning, and the conditions under which the work is carried out. In particular, the city of Orléans has maintained an ambitious policy of beautification and urban enhancement through several projects; it fully intends Line 2 to play a major role in this regard, which implies coordination with projects not yet defined as completely as the tramway studies. These differences in timing and scheduling call for flexibility as the tramway project develops, and will be cause for further study.

The Rue Jeanne d'Arc / Place de Gaulle sequence, in which the tram heads for the cathedral before crossing Line 1, is of course as iconic as it is sensitive in a district rich with historic monuments.

Engagement

- While the Line 2 project relies on geography and mimicry with the river flowing parallel to it, it was also essential to link the line's identity to the city's history; the strength of the central sequence gives the line a complete image and establishes it in the various districts it travels through. The line therefore leaves to the Loire, Europe's last untamed river, the privilege of crossing the city as the "third" of Orléans' "landscapes", interrelated with the urban context.

- Line 2 is therefore "in green and white": the large green ribbon surfacing the road in less-dense districts is edged with two white curbs; in the historic centre, it is this same very light tone that extends across the entire surface. It was obtained by Souppes limestone, already used in Orléans' medieval streets.

- The stations all along the line are similar: the platforms are great blocks of white limestone; the furniture surrounds totems distributing information and transport tickets, and the shelters match the rest of the network's bus shelters.

- There is a serious commitment to planting, in outlying districts, just as in the centre of the city, Place de Gaulle: Scots pines recall those of the neighbouring Sologne region. Stations have been planted with cherry trees, and hornbeams pruned into columns stand in the centre of Orléans.

- A carpet of greenery was specially developed for the line's image, for its verdant sections: two years of field testing led to the selection of seedling grasses and flowering plants, and substrates to enhance the image of the too-plain standard lawn.

- The overhead contact line poles were carefully designed: tapered and topped by stainless steel hardware, they are precise without over-sophistication.

- The tram functions on ground supply throughout the "intra-mail", the centre of the Aggl'O.

Results

In the very centre of the city, opposite the cathedral and in adjacent streets, there is an exceptionally successful sequence: the details of the ground surfacing are very carefully designed into the Souppes stone, creating a real continuity of the material with the white limestone Neoclassical façades, very similar in tone.

Place de Gaulle, completely redone, and despite being crossed by two tramway lines, has returned to being a place for pedestrians, clearly defined as the city centre: at the intersection of its cardo and decumanus, today there are tram lines; the town has, once again, a forum. The grassy platform bordered with white employs and extends this image to the outlying districts, linking the five towns with the Line 2.

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RUPTURE AND CONTINUITY / INTERVIEW WITH CHARLES-ÉRIC LEMAIGNEN, PRESIDENT OF THE ORLÉANS-VAL DE LOIRE URBAN AREA COMMUNITY COUNCIL

The city of Orléans has just inaugurated its second tramway line. Could you talk to us about how it started?

The second line was eagerly awaited. First was the indispensable study and review phase, as our new team promised in 2001. We then launched a very large consultation. This concluded on 8 July 2005 with a

joint decision (78 votes out of 84) on the type and route of the new tramway line: ground power supply, interoperable with line A, inaugurated in 2000. Line B is 11.3 km long and serves La Chapelle-Saint-Mesmin, Saint-Jean-de-la-Ruelle, Ingré and Saint-Jean-de-Braye, passing through the Orléans historic district. After this necessary and democratic debate to come to a consensus, we entered the production phase, in close concert with the five concerned municipalities. We made it a top priority to reduce the inconveniences - unavoidable with work project like this - for residents, businesses and the city overall.

Precisely, let's talk about finances. The cost of this line (€35 million/kilometre) is a great deal higher than that for Le Mans or Brest (€20 million/kilometre). Why?

Do let us compare what is comparable. We had the honesty to announce an amount at its June 2012 value, i.e. at project end. The €315 million voted in 2008 at the 1st June 2006 value corresponds to the €395 million in June 2012.

Moreover, making the tramway in the Creuse region cost less than in Paris. We decided to run it through the downtown, where property values are much higher than on the outskirts.

Finally, we completely assume our choice of a very high quality urban project. The obvious consequence of that is a tramway that costs more per kilometre than others. We limited our operating costs, but we didn't skimp on urban design. I would add that in 2005 we had optimal subsidies from the French State under the Grenelle de l'Environnement initiative.

What were you seeking to accomplish with this tramway line?

The tramway is first of all a means of transport; this second line considerably improves what we offer city residents. We've always had the same overall view: the tramway mustn't be the tree that hides the forest; it has to meet everyone's needs for mobility, which is why in installing it we also completely redid the 30 bus lines so that the entire network would be operational on the big day. We thought through everything to make transport comfortable and easy. Exit stage left the "only-by-car" means of transport; we created six monitored park-and-rides, a total of 1,140 parking places along the tramway route. Line B gives the streets back to pedestrians with the creation of 30 km/hr zones, widened pavements and more clearly defined open areas. A good share has been set aside for cycling along the route, with secure parking, dedicated cycling paths and long-term cycle hire available.

People have to have known Orléans before the tramway to understand how much the city has changed. Line B was a chance to undertake a wonderful embellishment of the city...

We didn't build this tramway on the cheap: we considered that our towns, as well as the residents and users, deserved the most beautiful and comfortable tramway possible for the price. We aimed for more than just a means of transport; in launching the work we undertook

a real urban development project. We assume responsibility for this policy of quality, and City has seen to it that its image has undergone a major transformation. We have demanded the best quality possible in materials and urban design, from the flowers decking the line to the choice of a ground power supply to preserve the aesthetics of Orléans' historic district.

Line B is decked out in the colours of our region: green for the grassy tram track and the great many native plants we patiently chose; and white, with the limestone and Souppes stone that our architectural heritage showcases. We didn't have to wait for the line to come into service to see the effect it was having. You only had to walk along its route, listen to what residents and passers-by were talking about, who had only good things to say about the project; you only had to open your eyes to see what a success it was: Place de Gaulle, full of pedestrians, busy and lively, recalls a pine grove; the Halmagrand intersection has become a noble entrance to the city, lined with charms; the view of the cathedral is stunning...

What feedback have you had on the first line and what improvements were brought to Line B?

As president of the Agglo urban area community council and contracting authority for the tramway, I have followed the project from the start with Muriel Cheradame, vice president of the urban area community council; we worked continually side-by-side, from concept to construction, in technical meetings and in the field. Week after week I was continually concentrating on only this project. We learned from our lessons and sought to avoid the pitfalls of our bad experience in 2000, especially in terms of noise disturbance. It took over three years and dozens of meetings! We demanded it be as silent as possible. First we entered into a very demanding agreement with Alstom - much more than what standards required - on noise management. Alstom worked on the rolling stock, the wheel profile, the infrastructure with welded rails as well as the grassed tram track - because it's known that lawn absorbs noise - and all along the line we installed floating slabs to limit both vibration and noise. We still have the sound of the bell signalling the tram, though, which is regulatory...

And during the works?

I desired and I asked both the companies and my «tram team» to be especially attentive to residents' needs along the route. For over three years construction of the tramway was a major, unpleasant worksite. Three and a half years of archaeological digs, network displacements, tram track installations, overhead contact lines to connect, rails to weld, plans to plant, slabs to fit into place, street furniture and fittings to install... I am fully aware that this all was a disturbance in the day to day, it's inevitable. But it was worth it. And I have to point out that the Agglo urban area community council gave a lot more support to businesses than with construction of Line A, since we both set up an ad hoc claims commission and low-interest loans. Compensation for Line B is four

times greater than what was paid to businesses when Line A was built, representing over €2 million all told.

Did you hold a consultation?

Yes, we built this new network on a very large consultation, one of the biggest ever undertaken in France on the subject. I demanded this, because it seemed legitimate to me that the Orléans metropolitan area transport network resemble its users and that it make their daily transport easier.

Alstom provided the rolling stock, but who designed the trains? Did you use a designer?

You know that Orléans belongs to Cosmetic Valley, with Shiseido, the LVMH research and development centre for perfumes and cosmetics under which fall Christian Dior, Givenchy, Guerlain, etc. So we asked Olivier Échaudemaison, Guerlain artistic director, to design the tramway's interior. With rather unexpected colours, he created two unique, elegant settings for our tramway in homage to the Cosmetic Valley of which we are proud, and to the Loire, to which we are much attached. Crossing the world of transport with that of cosmetics was very fruitful.

How does the interoperability between the municipalities the TER (local train) serves work?

When the AggIO set up its new ticketing, it called on its partners, including the Loiret General Council and the Centre Region in connection with the creation of the Moda Pass' card. The partnership with the département proved very productive since its network, Ulys, and that of the AggIO, TAO, today both use ticketing on the same media. As for the Region, it already had commitments to Tours, which launched its first tramway line planned for end 2013, but since the discussions were still underway, together we developed an information base, «JV-Malin», a global transport offering making it possible to take not only the train, but the tram, bus, etc.

Beyond transport and the urban project, what is the benefit of such an infrastructure for the city?

Today Orleans' strong point is its north/south and east/west coverage, which gives it a very high degree of coherency. With this tramway, accessible to all - youth, the elderly, the disabled - the network has a new line that structures, a modern means of transport that is clean and respectful of the environment. It contributes to social cohesion, development, embellishment of our city and it drives the economy; the Orléans tramway is an additional asset for our region, making it ever more attractive. It symbolizes the ambitions we have for our city, which is the first, among those with a population of at least 300,000 inhabitants, to have two tramway lines. When we are united, we can get things done - and we do! Great and beautiful things. I would not brag about it but I have no reason to be modest; now we're playing with the big guys, the big, well-equipped cities. Orléans-Val de Loire is a marvellous region, with marvellous men and women who should be proud to be the wonderful ambassadors they are of their region.

A word to symbolize the Orléans tramway?

Transport out of the ordinary.

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PLACE CHARLES DE GAULLE

Orléans' two lines cross each other and permit transfers at Place De Gaulle, at the far end of Rue Jeanne-d'Arc, along the Cathedral's axis. The square is rather poorly defined by its «Reconstruction» buildings; rather, it is its extensive greenery that makes it pleasant, a counterpoint to the Jeanne-d'Arc neoclassicism, and with an important element for both river-lovers and pedestrians alike: majestic Scots Pines recalling the Sologne region and shading the limestone underfoot; a series of wooden shuttered kiosks create a lively commercial continuity from Rue Jeanne-d'Arc to Rue des Carmes.

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RUE JEANNE D'ARC

Rue Jeanne-d'Arc is a very beautiful neoclassical street, cutting through the medieval district, and completely aligned with the Cathedral. The tramway and a lane of automobile traffic, indispensable for access to the district, share the space. The ground's surfacing in very carefully laid white Souppes stone creates a virtually continuous extent of the same texture between the white façades on either side; it blurs the asymmetry of the overall layout. On days of celebration the street is a long stretch fluttering with flags leading right to the Cathedral's portal.

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PLACE HALMAGRAND

Place Halmagrand is at the northern edge of Orléans' centre. The tramway there has ground-level power supply; the white limestone surfacing of the ground extends into a district already residential. Columns comprised of fastigiated hornbeam trees create, on the same scale as the buildings, what is truly botanical architecture in the triangular plaza; the design of the ground and street furniture quietly echoes the buildings' precise mouldings.

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CALENDAR

2006: competition

2007: preliminary design

2008: declaration of public interest and project studies

2009: return to project phase

2009-2012: construction

June 2012: start-up

DATA

Client: Orléans Val de Loire Metropolitan Area Community Council

Project management: SNC Lavalin + Pingat Ingénierie + Richez Associés + Atelier Villes et Paysages

Richez Associés' team: Thomas Richez + Vincent Cottet + Chiara Bonino + Najate Abouali + Christophe Henquinet + Mario Galli + Mélanie Fleureau + Pauline Courtier + Virginie Anselme + Éric Alcabez-Gariboldy + Miguel Rivas Mansuy + Jelena Jocovic + Aurélien Raguét + Bernadette Lazarus + Karine Clément + Marie-Charlotte Olivier + Christelle Terrail + Elsa Deconchat + Rudy Blanc

Photos credits: Cyrille Dubreuil + Didier Pruvot

FIGURES

A line 11.9 km in length

26 stations

21 trains

6 park and ride lots, (3 under other project management)

1 interchange

1 sales booth

1 maintenance centre (under other project management)

Cost: 395 million Euros, including:

Project management and studies: 32 million Euros

Preliminary works: 19 million Euros

Tramway platform: 23 million Euros

Pedestrian walkway: 5 million Euros

Road surfacing and support platform: 20 million Euros

(including quality surfacing: 16 million Euros)

Pavements and cycling paths: 5 million Euros

Car parks and ground-level park and ride lots: 1 million Euros

Street furniture and lighting: 6 million Euros

Signage: 2 million Euros

Traffic lights: 4 million Euros

Planting: 7 million Euros

Art works: 10 million Euros

Tramway stations: 5 million Euros

Technical facilities: 3 million Euros

Electromechanical equipment: 20 million Euros

Rolling stock and ground power supply: 51 million Euros

Buildings: 3.5 million Euros

Storm water drainage: 4 million Euros

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BREST : A TRAM TO COMPLETE RECONSTRUCTION

UNITY & LINKING

City

The city of Brest developed under Richelieu as both a major military port and dockyards. It was built overlooking the banks of the Penfeld,

a true fjord, and extends over the two plateaux commanding a view of the bay. Its historic centre was entirely demolished during World War II. Reconstruction of the city, under the direction of Mathon, completely redrew the lines and levels of the central district around Rue de Siam. This rebuilding made Brest a modern city in the 1950s and 60s. Town officials quickly sought to give it more soul with urban art, while the metropolitan area gained an economic second wind through its university, high technologies and maritime research, following the major slowdown in the dockyards and maritime industry.

The city of Brest had envisaged a tramway project in 1988, rejected at the time by referendum. Nevertheless seeking to develop its transports, in the 1990s the urban community ran one north-south bus lane, a forerunner of what would later be called the BHNS. François Cuillandre was elected mayor in 2001, after having announced that his programme included again launching the tramway studies. After intense concerted effort from 2002 to 2007, the project was again started up.

Issues

The project topography is complex, with slopes up to 8%; special technical issues exist as well, such as crossing the Penfeld, over the vertical lift Recouvrance bridge, the span of which will be replaced. The central context was rebuilt subject to a ZPPAUP (a status protecting architectural or urban heritage, or landscape); the next step calls for beautification and a renewed environment. The district comprised by avenue Jean-Jaurès is narrow and steep, and requires design work with special details. The intense joint effort informed and prepared many choices, especially regarding how the tramway project related to numerous other metropolitan projects; it also created extremely high expectations.

The contracting authority had strict budget goals, and was especially attentive to the environmental quality of the tramway's greenery: a thin layer of grass on concrete slabbing everywhere was unacceptable, as it would call for huge amounts of water and fertilizer!

Last, the designers noted the virtual absence of any sea views from Brest's centre. Will the tramway bring them to light?

Engagement

- Extensive pedestrianization of the downtown: Rue de Siam is no longer open to cars, like half of Rue Jean-Jaurès.

- Carefully developed concretes, of kaolin paste set off with blue glass, surface the ground. They are enhanced by their alignment and granite, a flat grey, laid out in a parquet pattern. Ochre granite inserts, scattered as if sown, break up the surface and extend over the station platforms.

- Prefabricated, these platforms create very precise surfaces in sometimes sharply sloped areas; stainless steel and naval-grey barriers surround them, inspired by nautical railings. Marking the limits are the four posts of the tramway's overhead contact lines, blue-lit by night, echoing the piers of Recouvrance Bridge.

- As an alternative to conventional turf, a protocol of tests conducted during the studies helped develop simple, frugal ground covers, adapted

to local conditions, by working with mostly native meadow and seaside vegetation. Their variations through the seasons – flowering, changing colour – mean they bring a real trace of Nature to the city.

Results

Through ground surfacing, opening up space and recomposing singular places, the tramway has permitted a better and different way to see Brest's centre. From the belvedere created Place des Français Libres, at the foot of Rue de Siam, as well as from the heights of Rue Jean-Jaurès, the tram has in particular opened up views of the bay and the narrows linking it to the sea. It fits in with the Brest Métropole Océane urban art project, by receiving seven new artworks on its route.

The biggest worksite in Brest since the Reconstruction, it finally functions fully as the backbone of the metropolitan area's project, by linking the new Frouven commercial district, renovation of the Europe/Pontanézen district, with demolition and rebuilding of 500 homes, the Plateau des Capucins, with the flagship operation to convert the old dockyards workshops and establish a sports stadium on the right bank. In this way it extends the Brest downtown to make it a true metropolitan centre.

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BREST RENAISSANCE / INTERVIEW WITH ALAIN MASSON, SECOND DEPUTY MAYER OF THE CITY OF BREST, RESPONSIBLE FOR SUSTAINABLE DEVELOPMENT AND GENERAL ADMINISTRATION, FIRST VICE PRESIDENT OF THE BREST MÉTROPOLÉ OCÉANE URBAN AREA COMMUNITY COUNCIL, RESPONSIBLE FOR SUSTAINABLE DEVELOPMENT AND MAJOR PROJECTS.

How would you describe Brest?

It is a relatively new city given that, at the end of World War II, 80% of its buildings had been destroyed. Reconstruction began from the 1950s and continued to the 1980s. We then undertook renovation of the existing buildings. To summarize, I would say that Brest is a modern city architecturally speaking, its face to the sea. Owing to reductions in State civil and military services, it has gone from administrative ranking to the status of a classic city, in other words one with services and industries.

How would you characterize Brest's inhabitants?

The people of Brest believe strongly in solidarity. This comes from what they went through during the war and the reconstruction period. People lived in barracks until the 1960s, which fostered solidarity.

How did the tramway begin?

This project was a continuation of the one proposed in the 1990s. It consisted of two lines, but had been abandoned following a public referendum. François Cuillandre is today Mayor of Brest and President of the Brest Métropole urban area community council. In his 2001 municipal election campaign he included a first tramway line in his pro-

gramme, saying there would be no referendum. Undertaken in 2004, the current project extends one of the two lines originally planned, by a few kilometres.

Why this insistence on an unpopular means of transport?

We had tried to set up bus routes in the 1980s to showcase public transport and reduce the number of cars in the city. But we met with opposition from both the people of Brest and businesses.

Developing public transport in a city like ours can't be done without disturbing people in what they are used to. Given the extent of the works involved, the tramway could not be up for discussion; it called for complete reorganization of the town with impact on how everyone got around, with city planning and urban design façade to façade. Given that the tramway idea had existed for several years, the people of Brest were prepared for it and finally accepted it. Even more so in that in the 1990s we looked like forerunners, whereas by 2004 several cities had adopted the system; we had the benefit of their experience. The Chamber of Commerce strongly supported the tramway project. They contacted these cities and learned that once the difficult period of works was over, the tramway could be very advantageous commercially.

It takes political determination to impose such a change. What challenges did this tramway face?

There were a lot of them. Given that it runs on electricity, it came under the Climate Plan and is part of the fight against the greenhouse effect that our municipality wants to take part in. Moreover, it is a comfortable means of public transport, accessible to all, and allows better social mix than the bus. Then there is the urban issue, which consists of taking another look at façade to façade streetscape design, and rethinking public areas. Politically speaking, it's major.

Why is the tramway important in terms of urban planning?

The major routes used so far for automobile traffic have become pedestrian streets, which didn't exist before. Further, the Mayor wanted the tramway to go through the Pontanézen district, which is undergoing urban renewal. This route called for us to destroy high-rise apartment blocks, which meant that under the Grenelle des Transports, we got an additional €19 million in grants from the French State.

Principally, what kind of opposition had the municipality met with, with this project?

The importance cars have is difficult to change and problematic. It's a deeply anchored habit. And then, whether business people, residents or visitors to the city, works upset people. First of all, we renovated all the road networks and changed their layout, moving them out of the tramway's way. This was our chance to create cycling paths and renovate the parks, generating significant earthworks and reorganization of the urban transport plan.

What did you do to get the plan accepted?

Regarding businesses, we tried to do everything possible to compensate them for the inconvenience. In collaboration with the CCI, in particular, we created an ad hoc claims commission to compensate them for loss in turnover. We also organized communication campaigns to promote businesses.

It would seem that you were exemplary in terms of the consultation?

We did a lot, to such a degree that members of the community impact assessment committee criticized us for not having enough complaints. This was of course what the game was about. We organized a great many public meetings, including in the districts and towns the tramway didn't go through, to show its impact citywide. We met several times with the trade unions to keep them informed about how the project was advancing. We came up with documentation, with a message adapted to each district, distributed in letterboxes. We also created a very complete website, opened a tramway space on Rue de Siam, Brest's main artery, with exhibits and staff available to answer questions. And then we recruited four mediators, had them there on the 14 km of the work-site, and had them listen to anyone's grievances; they passed them on to the concerned companies and collected information from residents.

Did the technical decision to electrify with a catenary system have anything to do with cost cutting?

Yes, but it was also tied to the slope constraint (up to 9.5%), that light rolling stock imposes. Ground power supply means batteries on the roof in case of power outage. First, this adds to the tramway carriage weight; secondly, it creates an additional cost and we had a tight budget. Moreover, to reduce the investment cost we made a bulk order with Dijon, which meant we saved 20% on the trains' purchase price.

What were your principal constraints?

The first was the slopes, which I just referred to and which brought up special issues: first, disabled access in the stations, which required doing something about the cant of the slope, and second, the trains, which needed powerful motors with three driving axles instead of two. Our other big problem was the Recouvrance lift bridge. Since the carriage weighs 40 tonnes, we had to reinforce the infrastructure of the bridge to protect it. So we had to change the bridge floor and make cantilevered footways for pedestrians, cyclists and so on.

In what way is the Brest tramway different from others? What have you done to make it unique?

Aside from the consultation we spoke of, we launched a design competition. The winner, Eric Rhinn, of Avant Première, made three different proposals for the tram's colours and nose, and it was a panel of Brest residents who made the choice. We also worked in partnership with the science park to make sure the Wi-Fi worked in the tramway. Moreover, we are studying the problematic of grassing, because the greater

part of the route is planted. We experimented with a mix of plants best adapted to the Brest climate and were thinking about a buried watering system that can't be vandalized.

One word to characterize the arrival of the tramway in Brest?

Renaissance.

Born on 16 August 1953, a local elected official since 1983, **Alain Masson** is Deputy Mayor of Brest, first Vice President of the Brest Métropole Océane urban area community council, responsible for major projects and sustainable development.

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RUE DE SIAM

Rue de Siam used to be incessantly busy with buses and cars. Now reserved for pedestrians and the tramway, it has become a centre for shops and outings, the ground surfaced with kaolin concrete and grey-blue granite. In its centre, two tramway lines separate to run around the Fontaines de Marta Pan, the surrounding ground surfaced in red granite. Elsewhere, planters hold eucalyptus. Their soft green leaves are in counterpoint to the somewhat severe mortar of the façades, in addition to dialoguing with the tramway colours; on the horizon, in the breach created by the tramway platform, an ocean view is perceptible.

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PLACE DE STRASBOURG

Place de Strasbourg was a major crossroads on the route leading to the town centre. It is now its gateway, a calm and wooded area, including a 300-place park-and-ride. With a tramway running down its centre, transfers between trams, buses and coaches are platform-to-platform here. Southward, behind a gentle embankment, the school opens onto a square surrounded by a wide circle of stone seating. Teenage students practice kissing there, although some prefer to hold hands and climb the steps Didier Faustino set in the centre of the plaza, for a look at the far-off harbour and sea.

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EUROPE

The Europe district has been completely redone: a row of low-rise buildings has disappeared, to make way for a boulevard with its buildings alongside; the tramway runs right down the middle, on a carpet of green edged with granite: it provides the district with a direct link to the downtown and a new image absolutely aligned with that of the city.

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CALENDAR

2001-2005: preliminary studies

April 2007: assessment of the joint effort

October 2007: project management appointment

May 2008: selection of tram design

Summer 2008: validation of preliminary project

July 2009: repositioning and renovation of underground networks

January 2010: declaration of public interest of the project

March 2010: start of tramway works

June 2012: start-up

DATA

Client: SEMTRAM for Brest Métropole Océane

Project management: Systra (agent) + Richez Associés + Atelier de l'Île

Richez_Associés' team: Thomas Richez + Vincent Cottet + Claire Puisant + Isabelle Nivez + Erwan Lemahieu + Romain Fournier + Laure Piraud + David Weisz + Johan Colin + Camille Alix + Ève De Liedekerke + Alexandre Piquel + Delphine Renard + Doucha Strub

FIGURES

A line 14.3 km in length

28 stations

20 trains

4 park and ride lots

1 maintenance centre

Cost: 383 million Euros, including:

Project management and studies: 53 million Euros

Preliminary works: 9 million Euros

Barrier works: 3.2 million Euros

Railway and roads: 156 million Euros

Street furniture and lighting: 8.2 million Euros

Planting: 5.4 million Euros

Art works: 7 million Euros

Technical facilities: 2.2 million Euros

Electromechanical equipment: 3.7 million Euros

Traffic lights: 3.7 million Euros

Railway signalling: 2.2 million Euros

Line electrification: 5.8 million Euros

Finishing works: 5 million Euros

Rolling stock: 63 million Euros

Maintenance centre: 19 million Euros

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CASABLANCA : A STREETCAR NAMED CITY PLANNING GRACE & IDENTITY

City

Casablanca, economic metropolis of the Kingdom of Morocco, today holding close to 5 million inhabitants, has been an urban laboratory. Its development began with the Protectorate treaty's signing, and the arrival in February 1914 of city planner Henri Prost, named by Marshall Lyautey to be "director of the special service of architecture and city planning". His plans to develop Casablanca were informed by French urban tradition, with alignments, grids and arched galleries, enlivening it with German and American experience: zoning and land-use. He gave Casablanca top ranking in the history of modern cities. In 1947, Michel Écochard, Casablanca's second great city planner, was responsible for the new plan to extend and organize the city. Inspired by the principles of the Athens Charter, his linear plan extended along the coast and connected the two ports of Casablanca and Mohammedia along the Casablanca-Rabat motorway; plots were structured together to create numerous neighbourhoods, ideal for building development and progressive densification.

In Casablanca's centre, the Art Deco district is a jewel of urban art insufficiently known and poorly maintained: In a very clear yet flexible urban order, it contains linkages and continuities, a rich diversity of architectures. Delighting the eye, a variety of styles are found there which each in their turn has come to the fore over the past century in this city proud of its architecture. From Art Nouveau to Cubism, without forgetting Arab-Andalusia culture under French influence, and the very present Art Deco – a whole unquestionably deserving to be on the UNESCO World Heritage list!

Issues

Before the project, Casablanca had not given its inhabitants a major public transport system.

Economic development came with automobile traffic, which increased daily; it suffocated the city and maintained the illusion that the public space was dedicated first and foremost to this traffic.

While waiting for subway and RER projects, designed but never financed, the authorities launched the tramway project, 31 km to be built in the first phase. The project was subject to long negotiations with the World Bank that wanted a "BRT" (Bus Rapid Transit) along the lines of the Brazilian model: a "functionalist" mass transit system running on what would very much be a road network, even motorway network.

Casablanca is twinned with Bordeaux; the city officials saw what a well-design tramway could bring to a city. They therefore insisted on a tramway project, determining goals for urban quality significantly higher than those for the Rabat tramway, initiated a few years previously.

"Façade-to-façade" work began to completely reconfigure the spaces the tram would run through.

How would it be possible for a tramway to have its own space without sacrificing that intended for pedestrians, with the pressure brought by proponents of “everything-automobile”?

How could an economically efficient reconfiguration be designed?

How could the tradition of urban art be revived, which had created the district as balanced as the Art Deco district, and established magnificent planted boulevards in the city?

Engagement

- A very educational presentation of the right-of-way problematic, insisting on the importance of completing the tramway platform with pedestrian refuges making it possible to cross it. The space devoted to these pedestrian refuges, without hindering traffic, increase the usual platform width to permit two rows of palm trees, consistent with how the Parisian Prost Plan handled major boulevards.

- Work on traffic flow in the city centre, allowing pedestrianization of the magnificent Boulevard Mohammed V, at the heart of the Art Deco district, and quite extensively, Place des Nations-Unies, on which it ends.

- A strong identity and precisely adjusted layout, achieved with simple means: exposed aggregate concrete ground surfacing in burnt sienna (the natural colour of the place, as can be seen at the beach), lines of dark grey stone.

- Very little grassing, too delicate and too needy of water, but 2,000 palm trees and 2,000 shade trees planted in pits with Corten steel containers holding their weekly watering.

- Coherent street and station furniture, inspired by Arab-Andalusia geometrics. Overhead contact line posts with blue tops: the blue combines with that of the sky and lets the palm trees dominate the tramway’s landscape.

Results

Morocco’s largest metropolitan area is very proud of this great example of city planning: it has a public transport service, the first part of its future network, and a step towards true organization of the bus network. Boulevard Mohammed-V exists again, after having been lost in the bustle of especially noisy automobile traffic and difficult access; it had lost its status of central importance to the city, and with the new Place des Nations-Unies, Casablanca discovers the great downtown urban space it lacked.

On the outskirts, the platform is carefully designed. Before the tram was brought into service it served as a meeting-point in the city, every evening welcoming people out for stroll, who delighted to sit in the station as if they were on a café terrace. It creates a reference point, anchoring the somewhat approximate alignments of the buildings and giving these quickly-constructed districts something of central Casablanca’s quality: clarity, greenery, with an extended and soothing space. Rabat quickly announced that its own tramway, already in service, would be brought to the same level...

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KING SIZE /

INTERVIEW WITH NADIA BOUHRIZ, DIRECTOR, CASA TRANSPORT TRAMWAY PROJECT

On what basis is a tramway decided on?

The Casablanca tramway comes in a context of greater and greater pressure owing to automobiles. Transportation is essential to making the Casablanca development programme a success. Several specific studies have concluded that a major programme to improve transport conditions through new transit routes combined with reorganizing and modernizing the existing networks, is promising. The urban transit plan the Region and the City created in 2004 called especially for increasing the mass transit offering by building four tramway lines, a regional express railway (RER) line and an underground train line.

The National Railway Bureau carried out the RER project. Meanwhile, the municipality wanted to get infrastructure works launched quickly. Questions remained as to the subway; the decision was premature, inasmuch as the cost was high. This is why the municipality opted for the tramway, which moreover has the main advantage of being marvelous for urban renovation. Opting for the tramway was a way of killing two birds with one stone: establishing a mass transit system and using the occasion to embellish the city.

What is special about the Casablanca tramway line?

In reality it’s a line and a half, since it splits in the Derb Ghalef district and extends over the 31 km linking the Sidi Moumen, Hay Hassani and Ain Diab districts and downtown faculties. A single tramway unit can transport up to 600 people, or 250,000 travellers a year! So it’s not an accident if we’re talking about a real system of mass transportation.

It was a big challenge, because the project is truly enormous and we have to carry it out in record time. Works were started in October 2010 to make service available in December 2012, which left two years to conduct the works... including trial periods and adding an additional kilometre to the line!

It was also a very «beautiful» project in several senses of the word: the aesthetics of the tramway itself were a success, Alstom having accepted personalising the tramway design. We did a lot of work on its shape and colours. We chose striking, brightly-coloured rolling stock, an image in line with the city’s dynamism and stature as an economic capital.

What was at stake with the «Casaoui» tramway?

I think the principle issue was to raise Casablanca to the rank of major world metropolis. First, by giving citizens an improved quality of life; second, by making it attractive for international investment. Casablanca is a very beautiful city and the municipality is looking to make it a major destination for those wanting to discover its civilization, culture and architecture. In this connection, the tramway creates a new way of divvying up the public space, in line with the needs of today and anticipating those of tomorrow.

Before the tram came, the public areas were rather deteriorated. Moreover, it is very different from the Rabat tramway, which doesn't have any urban restructuring. The project management team drew your attention to these issues, but were you conscious from the start that they needed to be taken into consideration?

Of course. As I told you, it's one of the arguments in favour of the tramway. But you're right, there are urban renovations and urban renovations, and we were well advised by the architects who not only convinced us but helped us from the beginning to the end - because the risk with a project of this size, is that the architect is happy to do the design, and to leave actually making it happen to the engineers. On the other hand, very often, the engineers' objective is to see the project functioning technically, while not concerning themselves much over the aesthetics. This is why an architect who works with the project manager and contractors during implementation is very valuable. You get a sense that this project is his baby, he doesn't let anything slip by, he looks at all the details and doesn't hesitate to double check. I remember that the first platform surfacing samples were catastrophic. The architect then worked a lot with Lafarge and the local cement and aggregate (laterite) suppliers to get to the natural earth-coloured concrete - between ochre and sand - that we have today: an improvement that raises the city's overall quality and is so successful that we use this material for other city projects.

What's happening in terms of the urban improvements in the public areas?

It has to be said that the project manager and its partners have not skimped: refurbishing of roads, curbs and pavements; façade renovation; natural stone in platform edging; platform concrete colours; new public lighting; tree planting; new street furniture, etc. His Majesty King Mohamed VI personally chose the materials, colours and furniture to not make the same mistake as at Rabat.

The most emblematic work was the improvement of two major squares (Place des Nations-Unies and Place Casa-Voyageurs), and turning Boulevard Mohammed-V into a pedestrian area, right in the Art Deco district, for almost a full kilometre. It was very difficult to get the authorities to accept this decision, at the time. But, just think, today they are asking us to extend the pedestrian area by 400 m. The Casablanca pedestrian is going to have his place, the place that cars had completely annihilated. You see, it's the full project, in all its extent, that resolves part of the urban transport issue all while improving the city.

And what did you decide about the platform's right of way?

A central right of way is the most common; it has no impact on residents' day to day life. But the notion of safety is very important in Morocco, because there are countless pedestrians and very few using the pedestrian crossways. As soon as it was possible - and systematically in the case of the lateral right of way, when the tramway runs down one side of the street - we decided to plant trees as we were installing the

platform: the lines of palm trees are there less for decoration and more to set apart the pedestrian area, or even make it a better payback. The greenery ensures safety.

You conducted a project management competition for the station design: what are you hoping for?

A great many participated in the competition. It was won by the Moroccan designer Asami, whose projects broke down into two types of stations, with a nod to the two architectures that have made Casablanca famous: Art Deco, for which Casablanca is the world capital, and the Moorish style seen in the Hassan II mosque. But the determining factor was the robust, long-lasting look of the stations, just like the imposing tramway we wanted, one that can't be missed.

Does part of the city being classed as historical create restraints?

Yes. Special studies had to be undertaken for buildings especially sensitive to vibration: fragile historic monuments, hospitals, etc. In this case, anti-vibration rails were laid.

One word to characterize the Casablanca tramway?

XXXL.

XXXL?

This project is outside the norms, not only because of its dimensions - 31 km on an extremely tight schedule - but because of its aesthetics - a platform in ochre-coloured concrete, edged with palm trees, specially designed stations and rolling stock... In short, it's a very big and very beautiful project!

Nadia Bouhriz graduated from the Ecole Spéciale des Travaux Publics de Paris in 1998. She completed her engineering training with a Masters in management organization from the Ecole Supérieure de Commerce de Paris. After one year with Bouygues in London, she returned to Morocco in 2000 where she worked for Arthur Andersen Casablanca. She then joined Lydec, where she held several positions in infrastructure investments and planning. In 2006, she joined the Agence pour l'Aménagement de la Vallée du Bouregreg as director of Rabat-Salé Tramway Infrastructures, before being called to direct the Casablanca tramway project.

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BOULEVARD MOHAMED-V

Boulevard Mohamed-V is the major axis through the Art Deco district. Downgraded by too much traffic and not enough building maintenance, the boulevard was a sleeping beauty that the tramway easily brought back to life. Redirecting cars to neighbouring streets completely changed the auditory environment, making it possible to create a beige granite pedestrian walkway extending from arcade to arcade. The most

beautiful palm trees have been preserved, and the exceptional series of façades, recently renovated in connection with the project, assumes its rightful place in the Casablanca landscape.

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PLACE DES NATIONS-UNIES

Place des Nations-Unies adjoins and structures the Art Deco district, the medina and the rebuilt section of the centre with its tall Hyatt Hotel. Formerly an intersection as well as a bus and taxi terminus, it is today a 3.5 hectare pedestrian area busy with tram-bus transfers. The Sienna-brown-and-black concrete surfacing faces off with paving that reuses stones laid during the French Protectorate. Islands of greenery, surrounded by bricked seating, offer shade with their ficus and palm trees. Without a doubt Place des Nations-Unies will soon become the Casablanca version of the legendary Place Jamaa-El-Fna in Marrakesh.

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BOULEVARD ABDELMOUMEN

Boulevard Abdelmoumen is the major axis to the town centre from the south. It is typical of late 20th century city planning in Casablanca: broad lines, relatively similar architecture, but an urban order less clearly defined than in the Art Deco district. The tramway runs down the boulevard, the very precise ribbon of its burnt-Sienna-brown platform edged by two rows of palm trees. This significantly diminishes vibration for the surrounding buildings; the downtown's network of planted boulevards, almost a century old, has been extended across the city.

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CALENDAR

2008: preliminary studies and design

2009-2011: project study

2009-2010: preparatory works, repositioning of networks

October 2010: platform ground-breaking ceremony

January 2012: delivery of first tramway train

April-August 2012: first trials and conductor training

12 December 2012: royal inauguration and start-up

DATA

Client: Casablanca Transports SA

Project management: Systra, CID + Systra Maroc + Richez Associés

Project management assistance: AEYSA + Transurb Technirail + ADI

Richez Associés' team: Frédéric Blerot + Thomas Richez + Najate Abouali + Céline Boclaud + Sylvain Eymard-Duvernay + Éric Alcabez-Gariboldy + Jérôme Touzé + Anthony Mopty + Karine Clément + Frédéric Ivanès + Margaux Vaninni + Romain Fournier + David Weisz + Lynda Benkaci + Pauline Courtier + Claire Puissant

Station design : Nejmi + Richez_Associés

Photos credits : S. Berca

FIGURES

A line 31 km in length

48 stations

48 trains of 60 m

4 interchanges

2 flagship locations

1,000 palm trees

Cost: 484,5 million Euros, including:

Project management and studies: 36 million Euros

Preliminary works: 4 million Euros

Networks repositioning : 36,5 million Euros

Art works: 1,6 million Euros

Platform: 109,5 million Euros

Roadwork and green areas : 35 million Euros

Urban equipments: 20 million Euros

Traffic lights: 3 million Euros

Stations : 16 million Euros

Traction energy : 21 million Euros

LV and control centre : 20 million Euros

Depot-workshops : 18 million Euros

Rolling stock: 146 million Euros

Related opérations: 18 million Euros

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TOURS : THE URBAN ART TRAM LANDSCAPE & FLUIDITY

City

Tours, classified as a City of Art and History, was built on the southern bank of the Loire in two centres in the Middle Ages, near the confluence with the Cher. A royal city, just as Orléans and Paris, it is the gateway to the Loire region and its châteaux, and takes gardening to the level of fine art. The route to Spain, under Louis XIV, established a large north-south route, cutting into the hillside on the north shore, in a city with a functioning oriented rather east-west. Tours then extended to the north and south on the plateau. A part of its downtown was burned by the German bombings in 1940; Rue Nationale was then rebuilt to the north, faithful to the traditional materials of the Loire region: freestone and slate roofs.

In 2009, Tours still had no tramway and no tramway project begun, whereas all the other competing cities in the Loire Valley had at least one line. Mayor Jean Germain regularly visited China; he was absolutely convinced that the first Tours line could be delivered in 2013, drawing on the experience gained in other cities.

Issues

The Tours Metropolitan area is clearly divided into three entities: the north bank of the Loire, the central "Mesopotamia" between the Loire and Cher, and the slopes of the Cher's south bank. The tramway has to contribute to bringing fluidity to this geography, and to strongly linking these parts. It also has to find a way to resonate with the spirit of the city, the cradle of French language, and without a doubt major part of its spirit and identity.

Beyond gardening, with the natural world subject to Man's control, or perhaps an extension of this idea, the city raises first, before the design phase, the issue of the meaning and overall spirit of the project in all its aspects: starting with the rolling stock, of course, and going to interaction between the tramway development and other urban projects, without forgetting the route, design of its specific furniture, the sound identity of the service, the bus colours, etc.

Moreover, the tramway travels in the heart of the city, through the largest historic district in France: designing its right-of-way must be especially attentive to this context.

Engagement

- Design guided by the principles set out by the "Ensemble(s) La Ligne" group, overseen by RCP Design Global, making the tramway, after the Loire, the heritage of its gardens and buildings, the "fourth landscape" of the metropolitan area.
- Traced with a strongly affirmed geometry, firmly establishing the tramway on the city's historical road, and taking possession of every space it crosses, it becomes reference geometry.
- Special development of the botanical aspect: the strong gardening culture is continued, going beyond conservation and development of the existing alignments of trees, into numerous smaller plantings, giving special character to each specific place.
- Long-lasting greenery: a permeable tram platform, greatly reducing the need to water, and alternative vegetation.
- Ground power supply for the tramway extending over 1.8 km of the historic section and the bridge over the Loire.
- The tramway stations participate in an "urban artwork" project, designed by Daniel Buren: his stripes punctuate the platform, thrusting upwards on the 6 m in height of the ticket distributor, a totem enamelled in red. The tram has the same motif: when stopped, it links the stripes on both platforms.
- The overhead contact line does not create a system of specific poles: they are candelabra of lights placed and reinforced to support, as discreetly as possible, the electrical lines.

Results

The tramway operation acquires overall coherency, never consciously sought in other cities until now, between design of the rolling stock and street furniture, urban development, the lighting plan and artistic involvement. The metropolitan area finds itself with a new dimension, both

in urban artwork, with Daniel Buren's imprint, and a means of movement, both new in creating the urban landscape forming a great link to draw entities together.

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THE TRAMWAY, A FOURTH DIMENSION OF THE URBAN LANDSCAPE / INTERVIEW WITH RÉGINE CHARVET-PELLO, DESIGNER OF TOURS « FOURTH LANDSCAPE »

Régine Charvet-Pello, you have settled in Tours, where you created your design and communication agency RCP Design Global. You are also Deputy Mayor for Education and Advanced Learning in the same city. Developing overall coherency is your trademark.

R.C.-P.: Global Design indeed aims to have an open and cross-cutting vision. For the Paris tramway Line 3, I first met with the people working with Jean-Michel Wilmotte, street furniture designer and Antoine Grumbach, who came up with the concept of the line's «boulevard gardening», before designing anything at all. I didn't want to just set our equipment design next to the work of other designers, but rather to work with and complete what they were doing to avoid «layering», where each expresses his talent as his bit of creative derring-do. Compiling like that can have worthwhile results, because everyone does contribute the best of their talent, but more often a global vision of the city is missing. For this reason we were trying to produce a design for the public and to serve others, with a more humanist outlook - and not just a consumer design, or an egocentric design.

How have you bridged the gap between design and education?

In Tours, my number one goal was to make a tramway that users would make their own. I imagined two ways of appropriation, showcasing and learning through the urban artwork of the Tours tramway: one through the world of manual know-how and vocational schools, the other through the University's intellectual world. In 2010, master craftsmanship, the network whereby each master craft passes on its knowledge, was listed as part of UNESCO's Intangible Cultural Heritage of Humanity. Since Tours is the cradle of master craftsmanship in France, I was interested in integrating this idea of master crafts heritage into the tramway project, as a vehicle for French know-how and to also make it the world's first «master craft» tramway. I went to see the master craftsman's organization, the academic director and vocational schools and I suggested working together on the stanchion inside the tramway, which looks like a little tree. In the hollow of the «branches», we imagined a metal bud. We proposed that each team, consisting of a master craftsman and vocational school students, take the project from creation to conclusion, in other words 21 teams for 21 trains. They are working today on each bud, from design to final creation, and it looks like we will have most interesting results.

In the same way, the Tours region is a land for literary excellence. So

many writers over the centuries have praised the gentle climate, the quality of light and sweetness of life next to the River Loire. François-Rabelais University and its literature department has begun the project of selecting literary extracts that speak of our region, from French and foreign works. Each tram station will bear inscriptions of one or several literary citations evoking the climate, geography or singular individuals from the Tours region.

How did you achieve design of the tramways?

It would perhaps be thanks to the immense talent of Roger Tallon and his designs for the TGV, Corail trains and other railroad equipment, that we designed rolling objects with an identity. Despite this, railway design has long been somewhat forgotten by the industrial world, as compared with individual automobiles. Fortunately, things have changed a great deal in the past 15 years. Tramways have become a design object of their own, a vehicle for city image policies. It proclaims a city's modernity.

Today I have a certain experience with rolling stock design, and especially tramways, since Tours is my eighth opus after Algiers, Oran, Constantine, Angers, the T3 in Paris and the Lyon tram train.

On the strength of this experience, when the call for tenders came out in Tours, I thought about how I could participate in this competition, because I am committed to my city's future and I'm a city elected official, for Education. Tours being my city, I wanted to show that political commitment could also be a complete thing, working lastingly for my city by working in a different, more modern way, thanks to the design of this public-use equipment. I had a legitimate right to do so and experience and know-how to offer to my city.

What were the terms of the assignment?

Cité Tram, mandated to assist with project management generally, very early on thought in terms of the line's overall identity. This rather exceptional approach consisted of seeking coherency and, perhaps for the first time in France, formulating a request more complex than that usually expressed by an architect and urban planner.

There were several points to developing the overall identity: a white paper that defined the line concept to be shared with all the project's major players; recommendations for various «products» issued by the line (street furniture, maintenance centre, park and ride, artworks, signs, etc.); attention to the line's environment and city planning; and finally, rolling stock concept and design. So it was a pleasure to me to respond to this call for tenders, because it corresponded completely to my overall vision of things. The tramway is not about just the 15 km of its line; in addition to its actual route, its catchment area extends for 500 m around it. Therefore it's a matter of thinking about the city's urban identity and not just that of a public transport alone.

What did you propose?

I wanted to come up with a different solution. My city deserved so-

mething better, it needed a multidisciplinary team to do more than the technocratic bare minimum. My first partners were the writers who found the words over the course of centuries to praise the Loire region and its people. I immersed myself in literature, from Ronsard to Laclavetine through Balzac ... And it was Henry James who gave me the creative key to the project: «Normandy is Normandy, Burgundy is Burgundy, Provence is Provence; but Touraine is essentially France.» That gave me the idea of putting together a cultural team of internationally renowned French talent.

I contacted Roger Tallon, designer of the TGV and father of contemporary design, who sadly passed away at the end of 2011 during the project; and Daniel Buren, the French artist specialized in on-site work. I got in touch with Jacques Lévy, geographer and city planner, to hear what he had to say about the European urban world. I also called on Louis Dandrel, sound artist and creator of the SNCF sound image, as well as Patrick Rimoux, specialist in light installations, especially for Brussels' Grand-Place, whom I appreciate for his modern vision combined with a sense of heritage. These wonderful people, gathered in a creative group I called «Ensemble(s) La Ligne», considerably enriched the project with their «franco-international» vision. And given that thinking about the tramway went further than the 15 km of the line, little by little it became a landscape of its own in the city. This is why we called it the «fourth landscape».

Why the fourth? What are the other landscapes?

The first landscape is geographical, with the Loire, which is virtually a magnetic pole, and its affluent, the Cher. But after the river comes the gardens edging it. Nature, fashioned by Man and therefore no longer completely wild, is the second landscape. It is this combination, characterized as a cultural landscape, which UNESCO has classified as World Heritage. Architectural heritage, entirely built by Man, is the third landscape.

History and geography have naturally developed in terms of East and West. In the 17th century the route to Spain created a first great North/South axis. The tramway today reinforces the modernity of this axis, profoundly marked by the hand of Man, to create the landscape of the 21st century.

How do you see your city?

I see it as a city eminently feminine, black and white - limestone and slate - lying between two hills. It is small and large at the same time; everything you need is there, yet it can be crossed by foot - which is why life is so very pleasant. The quality of the constructions, the presence of Nature and the gardens... all contributes to a perfect balance. Such a quality of life, sometimes close to indolence, not so long ago was considered a failing. Today it is completely modern.

What will this tramway look like?

In the middle of the city, a river runs through it, but also the tramway.

The tramway represents the river of people, the movement of mankind, with stations for islands. The rolling stock extends this metaphor. When we think «fourth landscape», we don't think about rolling stock, we think of a mobile element, a whole that permits fluid exchange. Since it becomes part of the urban landscape, it is designed as a piece of the city in motion. It is for this reason the tram does not have a nose. Designing one would have reduced it to the sole function of the vehicle. Whereas for me, it is not simply a vehicle; it is a kinetic element that moves on the platform like a slider on a mixing table, generating various intensities as it travels its line.

How did you create this conceptual approach materially?

With no nose on the tramway, there was no need for headlights. The rails extend on the front face, creating two luminous vertical bands (integrating the vehicle's optics), accentuating the notion of a slider on the line. The design is discrete to emphasize the link of the slider to the station, to the line, to the city. What could be the colour of this slider? That of the Loire River? Ains? No. Its colour should be that of the landscapes it traverses, the colour of time, in response to the magnificent light of the Touraine region. The colour of the fourth landscape. This is why its sides are surfaced with mirrors, not to encourage vanity but to reflect the landscape, as the lazy waters of the Loire River would. Finally, the tramway is in complete symbiosis with the city. It is not beautiful; it is right.

What was Daniel Buren's role?

We wanted this fourth landscape to be an urban artwork of its own and not, as is the case in Nice, using the city as a frame, to turn the tramway into a vehicle passing through an art gallery. Which is already very coherent. We wanted that the entire line be a work of art, which is why the notion of the slider and its relationship to the station needed to be reinforced. To do so, Daniel Buren, who really knows what a public space is about, designed the singular black-and-white stripes of his body of work on the tramway doors, which continue on the station floor. When the rolling stock stops in the station, the stripes on the doors line up with the stripes on the ground; the doors open and the ritual of exchange may take place. Owing to the humility of his design, the rolling stock disappears to become the media of an urban work of art. A useful work of art. The work of art is service. The work of art circulates, is accessible to all, democratically, the true example of «living together» on the line's 27 stations. We are very far beyond simply designing a product. It's an innovative approach, pushing the limits of thinking about art, the city and mobility.

How does this concept of an urban artwork extend in a larger sense to the city?

Jacques Lévy said that a city begins at its outer districts and the care put into planning them impacts the rest. All along the route and at each of its ends, in six different places, Daniel Buren's artwork appropriates the tramway's environment, infiltrating the catchment area. The artwork «breathes» all along the line with greater and lesser intensity.

Architect Jacques Ferrier has made the concept of sensual architecture his own, and you spoke on the subject in connection with the Pavilion he made for the Shanghai World Exhibition. Has your exploration of sensorial design been useful in dealing with the tramway?

Sensorial design is about using tools to improve perceptions of well-being and comfort, and putting them to work for «product» conception. It's about making something subjective, objective. If we take the sense of touch, what can we say about it? Smooth, how? Cold, how? Can we measure it, reproduce it? For 20 years we have been exploring the subject with Jean-François Bassereau, instructor and researcher. We are at the origins of the new Centre d'Etudes et de Recherches Universitaire sur les Technologies du Sensoriel (University Research and Study Centre for Sensorial Technologies) which opened in early 2012 in Tours, Certesens. We did indeed think about new approaches to the senses that we proposed for the Tours tramway, a way of design completely oriented toward user comfort.

How can design create a sense of well-being?

For example, by modifying light intensity on the colour harmonies, to give an impression of coolness in summer and warmth in winter. We also worked on the sound environment with Louis Dandrel, and we proposed various qualities of touch experiences at different hand-hold points in the tramway. The tramway interspace is conceived as an alleyway, a place where you can walk around or settle down as you wish. Each side has a special inside «façade», like in a street, with a very present «glossy» red urban part, while the other part is woodier, matte. We wanted that this territory, devoted to mobility, have that extra bit of soul. The several talents conceiving it have brought that out, permitting each individual in the future, whether he uses it, strolls past it or employs it regularly, to develop the power of his imagination and his sense of well-being by being in contact with the fourth landscape.

Born in 1957 in Algiers, **Régine Charvet-Pello** graduated from Ecole Boule in 1980 before joining the Société des Artistes Décorateurs (SAD), at the Grand Palais, to promote young creative talent. After having been a palace decorator in the Middle East, she created her Tours design and communication agency in 1986. RCP Design Global develops projects turned to new ways of life, combining diversity, quality and innovation in numerous realms, including urban design and public transport. She has also been conducting exploration for 20 years on sensorial technologies and in early 2012 opened, in partnership with the Université de Tours, Certesens, a centre of study and research on the subject.

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RUE NATIONALE

Rue Nationale is the central sequence of the main road in Tours, joining the two river banks and as such creating the route to Spain under Louis XIV.

Marked by post-war Reconstruction architecture, home to a great many shops and with a lane reserved for buses prior to the tramway, the street turns completely into a pedestrian zone at its end. Like the entire road, it has a grey-beige limestone surface, set in smooth slabs. On the Pont Wilson and in the Tranchée, on the other bank, it is more textured, ranging from roughened to rough-hewn. The pattern of a grey and white grid, a signature in numerous Tours public areas, appears again as monochromatic ochre panels punctuating the ground surfacing.

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AVENUE DE L'EUROPE

Avenue de l'Europe is the main road of one of the North Tours districts, built in the 1960s; its central expanse is planted with a majestic series of cedars. The tramway takes one of the pre-existing roads, while the other receives two-way car traffic. A specially-designed series of overhead contact line poles makes it possible to almost completely keep the cedars, and the tramway of course runs on a lawn; the avenue therefore become the big linear garden that the cedars were waiting for to feel completely in their right place

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JOUÉ-LES-TOURS

The tramway runs near the Joué-les-Tours town hall, before a plaza of strips of exposed aggregate concrete spaced with hedges. With the coming of the tramway, this reaches to the opposite façade. Place François-Mitterrand is therefore extended and amplified: it becomes an obvious link to the neighbouring shopping street, and truly a central space in the municipality.

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CALENDAR

June 2009: project management appointment

December 2009: preliminary design

December 2010: declaration of public interest

August 2010: project

February 2011: start of networks repositioning

March 2012: start of tramway works

Start-up projected for late 2013

DATA

Client: Citétram for the Sitcat (mass transit authority for the Tours Metropolitan Area Community Council)

Project management: Systra (agent) + Safège + ECCTA + Richez Associés + Ivars & Ballet

Richez Associés' team: Thomas Richez + Vincent Cottet + Aurélie Farret + Ivana Rho + Camille Alix + Pierre-Alexandre Cochez + Juliette

Vignes + David Weisz + Sophie Érault + Miguel Rivas Mansuy + Virginie Chardin + Mario Galli + Olivier Bosoni + Alexandre Piquel + Bernadette Lazarus + Martin Lucas + Clément Duaut

Station design: RCP + Daniel Buren

Lighting: Pierre Bideau

Perspectives credits: Franck Rives

FIGURES

A line 14.8 km in length

29 stations

21 trains

Cost: 369 million Euros VAT excl., including :

Project management and studies : 52 million Euros

Site clearing : 3,4 million Euros

Infrastructures : 63 million Euros

Platform VF : 45 million Euros

Systems : 29,3 million Euros

OCS : 10,7 million Euros

Platform plantings : 2,8 million Euros

Green spaces: 3,7 million Euros

Natural stone provisioning : 6 million Euros

Station : 6,7 million Euros

Urban street furniture : 0,5 million Euros

Buildings (without maintenance center) : 3 million Euros

Art works : 3,5 million Euros

Street lighting : 2,5 million Euros

Rolling stock : 66 million Euros

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PUSHING THE FRONTIERS ON TRANSPORT

CONCLUSION

The architect's presence in tramway design may be surprising to common sense – after all, what is an architectural firm, albeit backed by city planners and landscape architects, doing in the highly technical job of setting up a transport system - even if in the urban environment? It has nothing to do with building buildings! Nevertheless, architects are now recognised as essential to French-style tramways. As part of the French decentralization process and following the good example others set, local authorities have combined both urban transport and development policy for their tramways. They have drawn on their own administrations, as well as advisors and sector experts to do so: city planning agencies and urban architects for route determination and to situate the line in urban development policy, renovate city centres and place it in neighbourhood policy; then architects, landscape architects and designers to shape the tramway line from beginning to end.

Working in tandem with specialised engineers, French architects and landscaper architects have therefore been able to revive urban art as a

way to compose and order the public space, as at its apogee under the great French urban planners Haussmann and Alphand.

Hence a global vision of streetscape has emerged, focused on mass transit axes. Roomy, smoothly flowing, clean, quiet, comfortable, generating a new traffic layout coordinated with other means of transport, a medium for new rules to access the downtown core, the tram has become a tool for bringing urban coherency and restructuring. One cannot overstate the importance of this structural element in revolutionising the face of the city.

Thirty glorious years of French-style trams have already equipped 26 French cities. However, it can be expected in the future that few cities will join the club; almost all municipalities with over 200,000 inhabitants are already equipped and French distribution means that there are almost no cities left today with between 100,000 and 200,000 inhabitants. Therefore, to what horizons can the tramway movement turn, given its start combining transport and urban planning? There are two possibilities: bus rapid transit systems (BRT) in smaller urban areas, and light rail transit systems (LRT) in truly metropolitan areas.

1. Mid-size urban areas and bus rapid transit systems

Cities with fewer than 200,000 inhabitants are increasingly turning to creating bus rapid transit systems (BRT); the ideal is to develop projects similar to the tramway experience, but with the more affordable transport system and its better adaptability to changing passenger volumes. Three obstacles hinder operations:

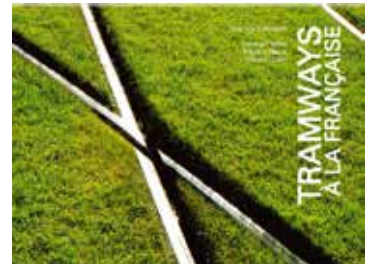
- a bus, even physically modified, is not as attractive as a tramway: in urban areas where the bus is still essentially the means of transport for those who cannot afford a car, the rapid transit bus does not have the tramway's ability to change habits and attract all segments of the population;
- the fact of it being a street transportation raises two issues: it cannot operate as flexibly as a tramway, which can cope with many possible surfaces between its rails; a bus-specific lane is very wide, too easily simply a pavement prohibited to general traffic; and the fact of its returning continually to general traffic means that at every intersection there is a reduction or even loss of continuity – nevertheless the very essence of the project;
- finally, governance of French urban areas with under 200,000 inhabitants lacks the clarity of big-city policymaking: the inter-communal structure specifically managing this size of community is very often politically weak, incapable of bringing strong investment and development decisions, whereas a dedicated continuous bus lane requires unflagging drive behind it.

2. Metropolis and light rail transit systems

The second frontier to conquer in streetscape and transport projects is at the metropolitan level: the tramway is now fundamental to our cities and tomorrow may be what drives them, as can already be seen with certain line extensions in France's major cities: Bordeaux, Nice, Stras-

bourg, Toulouse, Lyon, Clermont-Ferrand, Grenoble, etc. Between regional train and local tramway, the LRT offers highly-tailored service in both urban areas and suburbs, for the right contexts. The LRT functions like a train in less densely-populated areas and more like a tramway in town centres – quite an affair. After abandonment of the project between Saint-Paul and Saint-Denis in La Réunion, Richez_Associés is currently studying the logistics for the Massy-Evry line.

Therefore, serious challenges - that the architects centre stage in this book are delighted to be facing!



TRAMWAYS À LA FRANÇAISE

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