Proceedings of the GTFE Health crisis management by road tunnel operators

Contents

1 Introduction

Caused by the Covid 19 virus, the health crisis experienced since the beginning of 2020 in the world and in France in particular has disrupted our lives and our ways of working. Everyday life and all sectors of activity have been impacted, including road tunnel operations.

In March 2020, the government imposed certain restrictions and mandatory measures were implemented. Over time, these measures have been adapted as the pandemic has progressed (see box opposite). More than a year after the start of the pandemic, the crisis is still ongoing, with many uncertainties for the future.

Due to this context, the autumn meeting of the GTFE, which is usually organised in person, was held in webinar format on 24 November 2020. The topic was very topical as it was about sharing the management of the health crisis experienced by road tunnel operators.

It is worth noting that PIARC (World Road Association) has taken a similar approach to the WGFE by organising not one but several international webinars for road operators to share experiences in dealing with this crisis.

This document provides a first overview of the measures taken by road tunnel operators to ensure their mission in the context of this pandemic. It is enriched by the analysis of the answers to the questionnaire, concerning the organisation of the PCs, sent by the CETU at the end of 2020 and by interviews on the organisation of exercises.

Phase 1: Pre-pandemic in France (January to March 2020)

In early 2020, the first cases of Covid were detected in France and Europe. In February, the French government introduced the first measures to limit the pandemic: a ban on gatherings of more than 5,000 people in enclosed spaces (29 February 2020) and then a ban on gatherings of more than 1,000 people that are not essential to the continuity of the life of the nation (8 March 2020).

Phase 2: first generalized containment (March to May)

On 12 March, the government imposed the closure of establishments for children (crèches, schools, colleges, lycées and universities) until further notice. On 15 March, this closure was extended to all public places not essential to the life of the country. On 17 March, a 15-day generalized confinement was imposed on the entire population. The state of health emergency allowed the government to extend the lockdown twice, ending on 11 May 2020. This containment consisted of :

- limit economic activities to essential ones;
- prohibit travel outside the home, with a few exceptions, namely commuting or business travel that cannot be postponed and for activities that cannot be carried out by teleworking;
- systematise teleworking where possible.

Phase 3: Deconfinement (May to October)

The decontamination was progressive with a resumption of economic activities according to a differentiated schedule. However, as of July, as the epidemic resumed, the government imposed the wearing of masks in public places, and then from September onwards for employees in companies. In October 2020, 8pm curfews were put in place in the territories most affected by the epidemic.

Phase 4: second containment (October to December)

As the pandemic grew, the government imposed a second containment with fewer restrictions than the first but with a demand for increased use of teleworking:

- schools, colleges and lycées remained open;
- the trips have been authorised with a certificate;
- only bars, restaurants, theatres and cinemas remained closed.

In France, the two main measures to deal with Covid 19 were containment and the implementation of strict health protocols. In the field of road tunnels, containment has had direct consequences on traffic, which has fallen sharply, and the implementation of the health protocol has significantly modified the organisation of operators. In concrete terms, this has resulted in new provisions for the monitoring of structures on the one hand and an adaptation of the responses to certain regulatory requirements (exercises, training) on the other.

This paper is being written at a time when the crisis is still not over. Therefore, further lessons will have to be learned from the continuing crisis.

2 Containment and road traffic

As mentioned in the introduction, the management of the pandemic went through 4 phases in 2020. Some of these, notably the containment phases, had a significant impact on road traffic.

In this field, the impacts in neighbouring countries are more or less the same as those observed in France.

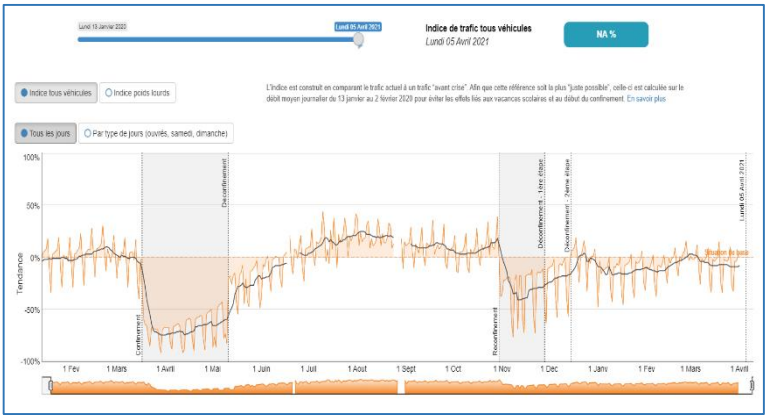

Figure 1- Evolution of all vehicle traffic in France since 13/01/2020

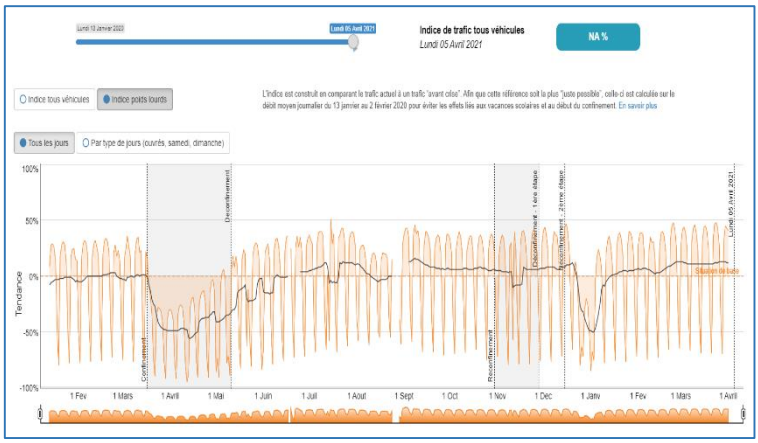

Figure 2- Evolution of HGV traffic in France since 13/01/2020

Phase 1: Pre-pandemic in France (January to March)

At the beginning of 2020, the pandemic did not seem to have affected the country. Road traffic and tunnel operations had not been affected.

Phase 2: first generalized lockdown (March to May)

As the population was obliged to stay at home, road traffic fell sharply on all networks (urban, interurban, cross-border). This drop was as much as 75 to 89% on average over a 7-day period[1]. However, the road transport infrastructure had to continue to play its role in guaranteeing the same level of safety for users, even if there were fewer of them.

Phase 3: End of lockdown (May to October)

Traffic has started to increase again, with the situation becoming comparable to that of the pre-containment period, particularly during the summer. However, as with all professional activities, the organisation of infrastructure operations, and therefore of the tunnels, had to be adapted in order to comply with the health regulations imposed by the government.

Phase 4: second lockdown (October to December)

Although there was a decrease in traffic, the second containment, which was less strict than the first, had less impact on all vehicle traffic. In particular, heavy goods traffic remained at a level comparable to that of the decontainment phase, probably due to the continuation of economic activity and the approach of the end-of-year holidays. In addition, health regulations for professional activities were tightened.

The traffic in the tunnels has experienced the same evolution as the traffic on the road network. This trend was confirmed at the GTFE meeting as shown in the DIR MED graph opposite.


Comparatif trafic confinement
100,00 %
90,00 %
80,00 %
70,00 %
60,00 %
50,00 %
40,00 %
30,00 %
20,00 %
10,00 %
0,00 %
A50
A507
A51
A55
A7
07/04/20
15/09/20
17/11/20

3 Sanitary constraints and organisation of operators

3.1 Adaptation of operators' tasks

Reminder of the operator's main tasks

- the **viability** of the structure and the **management of the assets**: monitoring of the civil engineering and the condition of the equipment, programming of planned maintenance and renovation work, organisation of detailed inspections;
- preventive and real-time **traffic management**: surveillance from a PC, direct surveillance by patrols, actions from the PC (command and control) and interventions in the structure;
- the **safety** of people: users and staff working in the tunnel;
- real-time and predictive **information** for users;
- **Crisis management**: in terms of traffic (incident, accident, fire, etc.) and equipment (loss of power supply, BMS system failure, etc.);
- crisis management **preparation**, safety exercises ;
- **feedback** from events.

The regulatory framework requires the road tunnel operator to perform a set of tasks (see box opposite) to ensure the continuity and safety of tunnel operations.

To do this, it puts in place an adequate **organisation** in terms of human and material resources.

To this end, operators are generally structured around 3 entities: surveillance (patrols and PCC), maintenance (preventive, curative) and support functions (personnel management, human resources, etc.).

This organisation makes it possible to manage both daily missions and occasional crises linked to events (incidents, accidents) that may occur in the tunnel.

From the first containment, in a context of low visibility in the medium term, the operators **implemented a specific strategy** to ensure the continuity of traffic while guaranteeing the safety of personnel.

Most of them first carried out an analysis of their activities in order to identify the so-called essential missions. They have thus differentiated between priority and regulatory missions that must be carried out imperatively (managing traffic in tunnels while guaranteeing users a sufficient level of safety), and other missions that can be postponed.

Feedback: Identifying core tasks: Escota

While the introduction of the lockdown had an impact on traffic, it did not stop completely because of the need to provide for the basic needs of the population and to care for the sick people of Covid 19. Thus, the first decision was to distinguish between essential and non-essential missions in order to both guarantee the safety of staff and ensure the continuity of public service missions. Thus, the following missions were defined as essential and privileged to be ensured:

- Sustainability / safety (patrol, winter maintenance)
- Traffic management (PC)
- Tolling: remote operation of toll facilities
- Maintenance of assets in line with regulatory obligations
- Staff prevention: work procedures and health protection equipment

3.2 Health protocol: a strong impact on the way missions are carried out

After identifying the essential missions, and in order to comply with the sanitary measures imposed by the government (see box opposite), the operators were obliged to review certain existing practical arrangements (new operating methods to be defined).

Firstly, the operations managers identified which activities could be carried out by teleworking and which ones required a mandatory presence on site.

Among the activities that require an on-site presence, there are essentially certain administrative tasks that cannot be performed remotely, **surveillance tasks** (PC operators, patrols) and **priority maintenance tasks** (corrective maintenance).

Health measures imposed by governments

In order to limit contamination and the spread of the virus, barrier measures have been recommended by the medical profession and stopped by the government. Applicable by all, in the private as well as the professional sphere, these barrier gestures consist in:

- wearing the mask ;
- respect the social and/or physical distance of 1 m or 2 m depending on the case and the period;
- Regularly wash your hands or use a hydroalcoholic solution;
- cough or sneeze into your elbow or handkerchief;
- use a single-use handkerchief;
- keep social contacts to a minimum;
- avoid touching your face;
- air rooms for 10 minutes, three times a day;
- greeting without shaking hands and stopping hugging.

The reinforcement of measures included further limiting the number of people in meeting rooms, increasing the distance between people.

Operators also identified the following risk situations that may be involved in face-to-face activities:

- contact situations between agents present on site;
- situations of contact between users and operating staff: this concerns in particular patrols (for a broken down or injured user) and toll collectors (for toll structures);
- situations of contact between staff and external actors (fire brigade, police, external service providers, etc.).

In the face of these risky situations, special instructions were drawn up and put in place, clearly favouring, where possible, remote means of communication: video-conferencing, teleconferencing, telephone, etc.

All these special arrangements have had a major impact on the usual organisation.

Finally, in order to disseminate information and facilitate the adoption of the new operating procedures by their staff, while being as educational as possible, some operators have chosen to innovate. For example, they have developed tutorials presenting these new procedures in video format and then made them available on dedicated platforms, so that staff can read them according to their needs and availability.

3.2.1 Measures for all personnel present on site

The operator has provided its staff with masks and individual hydroalcoholic gel, which have become indispensable. The staff, for their part, have become accustomed to using them in their working environment, as well as in everyday life.

Other measures could also be put in place.

Thus, for activities that required the simultaneous presence of several people in the same limited space, the operators reviewed the terms of use of these premises in order to reduce situations of too great proximity.

Depending on the configuration of the premises, some operators have set up traffic patterns to prevent staff from passing each other. They provided separate break areas. For the few

face-to-face meetings, and where possible, some operators preferred to hold them in the open air or in larger spaces usually intended for other activities, such as lobbies.

For staff working outside their place of employment, some operators have negotiated agreements with professionals, who were closed by government decision, for accommodation and catering.

3.2.2 Specific measures for patrols or maintenance workers

For patrols and maintenance activities that can only be carried out in person, some operators have chosen to use only volunteer staff.

In addition, in order to limit unnecessary contact between field staff working in different locations, operators have had to organise staggered shifts and therefore set up specific schedules.

Wherever possible, one person per shift was used. Where this was not possible, the physical positions of the agents were marked (drawn) on the floor.

Some operators have been imaginative in enhancing the protection and safety of their employees: customisation of equipment, use of gloves over conventional gloves, use of a keyboard protector, use of a distancing box[1], possession of a lone working alert box and identification of water bottles.

> **Feedback: Taking account of health instructions: Escota**
>
> As part of its usual activities, and before the pandemic, Escota had drawn up sheets describing the operating procedures for interventions in the field. 45 of them were reviewed and adapted in order to propose new intervention methods that would allow for the respect of barrier actions. This concerned marking out, emergency intervention procedures at toll booths, the use of vehicles, etc.
>
> A detailed schedule was put in place to allow field officers to collect their route sheet from different rooms, at a quarter of an hour interval. A circuit was also devised so that agents who had to take a vehicle could know where it was and the corresponding route, which avoided crossing other agents. Each employee was provided with an individual case so that at the end of their mission they could clean their own tools and the vehicle used. In addition, Escota provided its employees with an alert box that vibrates when the distance between agents decreases.
>
> In order to ensure that their health instructions are respected by external companies, the operators had to revise the specific health and safety plan (PPSPS) by means of an amendment on biological risks. These were subsequently integrated into the PPSPS

In the same way, the operators have put in place instructions for cleaning the equipment used. These are real routines that are now applied by the employees.

[1] Device to be worn by each worker and indicating when the distance is smaller than that imposed by the health protocols.

With regard to maintenance, some operators have used the technique of augmented reality[2] for work requiring very specialised knowledge: with this system, the specialist could guide the maintenance agent, equipped with "google glass" type equipment, remotely in the handling or repair to be carried out.

Feedback: New modes of communication identified by PIARC

3.2.3 Specific measures for subcontractors

Given the health context, some subcontractors exercised their right to withdraw. As a result, when the mission was set as a priority by the operator, a new service provider had to be found by launching a new consultation and concluding a new contract. The deadline for carrying out the work was therefore extended.

In order to control the intervention of external companies, the operators had to revise the specific health and safety plan (PPSPS). They first attached an amendment to the PPSPS to include the health measures to be respected by the company. Then, as the pandemic continued, a new paragraph on biological risks was added to the PPSPS as a permanent feature.

3.2.4 Specific measures for officers at surveillance CCPs

When several operators are stationed at the surveillance PCC, operators have been able to install plexiglass windows to allow "distancing". In addition, some operators have preferred to set up fixed pairs (always made up of the same people) in order to limit the number of contacts between staff. In the same spirit, some PC rooms have been made safe, with access strictly limited to authorised persons.

Another distancing measure devised by operators with an emergency PC is the use of the latter as a quarantine area for agents who are said to be "contact cases" but who can work; others have separated the teams either according to their position (open-air traffic and/or tunnel surveillance on one side and event management on the other) or according to the structures to be monitored.

[2] Virtual reality: representation of a 3D world by means of a device equipped with movement sensors which immerses the person in this virtual universe / Augmented reality: the real is enriched with virtual elements or images by superimposition.

4 Pandemic and tunnel surveillance strategy [3]

4.1 Reminder of the principles of tunnel monitoring for level D4 tunnels

Level D4 monitoring is permanent monitoring of the structure (24/7). Its purpose is to manage the proper functioning of the structure in routine situations and to deal with events (incidents, breakdowns, accidents, etc.) of very variable occurrence depending on their nature. The provisions for managing non-routine operating situations are presented in the intervention and safety plan (PIS) (see box opposite) in France or its equivalent abroad. It is the operators in the PCC (control room) who manage equipment malfunctions and events with the help, if necessary, of the patrols, maintenance, and even other players (emergency services, police, etc.).

Regulatory and technical framework

On the French regulatory front

In France, the Road Code gives special consideration to underground structures longer than 300 metres, structures *"whose operation presents particular risks for the safety of people*". As such, it requires a safety file to be drawn up for the authorisation to operate a tunnel and the renewal of this authorisation every 6 years. Thus, in accordance with Article R. 118-3-2 of the Road Code, the safety file must include an intervention and safety plan, the content of which is described in the Order of 18 April 2007.

"The intervention and safety plan defines the organisation and tasks of the operator as well as the methods of alerting and coordinating with the intervention services for situations likely to jeopardise the safety of people, including disabled people or people with reduced mobility.

For these situations, it describes in particular:

a) The organisation of command and coordination of the operator's resources, distinguishing between the different levels of responsibility;
b) Internal and external monitoring and alert procedures ;
c) Situations requiring the closure of the structure to traffic ;
d) The principles of action and the means to be used by the operator, as well as the methods of coordination with the external intervention services;
e) Traffic management and transfer arrangements within and outside the structure;
f) *Devices for recording events, decisions and actions*".

At the operational level

The SIP includes :

- an organisation to operate under normal conditions, also called nominal operating conditions;
- actors whose role is to ensure the safety of people in the event of an event;
- a warning diagram that specifies how the actors interact;
- action synoptic tables that allow the definition of procedures to be implemented in the case of predefined events;
- minimum operating conditions which, if exceeded, lead to the closure of the tunnel.

[3] This section refers to the presentations made during the webinar and to the analysis of the 17 responses to the questionnaire sent after the GTFE. These 17 replies represent 17 CPs and 87 tunnels, 35 of which are abroad and 5 bi-national. Almost all of them are in D4 surveillance (except 2) which represents 27% of the tunnels in this category in the CETU database (Dicos)[3].

4.2 Changes in monitoring conditions

Tunnel supervision is conditional on the presence of one or more operators as mentioned in the SIP or in the document describing the organisation.

In the health crisis situation, the operators had to prepare to manage more frequent absences due to contamination or quarantine (contact cases). At the same time, the crisis resulted in a drop in traffic, which was accompanied by a lower number of events and alarms, as shown in the graphs opposite. It should be noted that the number of events appears to be lower between the two confinements while the traffic had returned to its initial level: it is not easy to really explain this phenomenon.

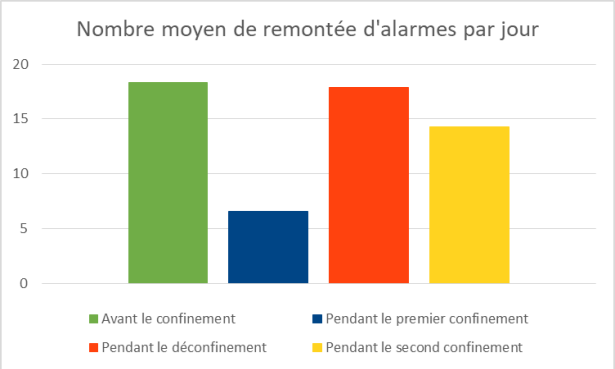

Figure 3: Average on the average number of alarms raised per day of 7 operators - Standard deviations are not presented due to the very small sample size.

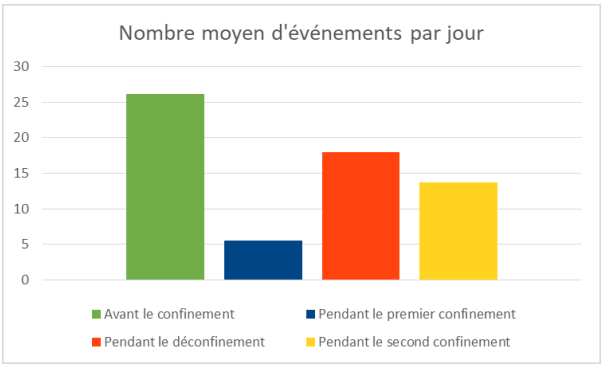

Figure 5: Average over the average number of events of 7 operators per day - Standard deviations are not presented due to the very small sample size.

4.2.1 Nominal mode

Some operators managed to maintain their nominal mode of operation throughout 2020, i.e. they kept the same number of staff assigned to surveillance during the crisis.

4.2.2 Gradient mode

Faced with the unavailability of operators (agents suffering from Covid 19 or in isolation), the operators sought to apply the CME in degraded or critical mode (initial CME), which provided for the use of on-call managers (e.g. Métropole d'Aix Marseille), former operators (e.g. DIR Med), or specifically trained administrative agents (e.g. Mobiris).

The drop in traffic during the first containment period led some operators to favour the "off-peak" and "peak" differences (often stipulated in the SIP). They were thus able to reduce the number of operators by assigning during the day the staff usually planned for the night or the weekend (e.g. DIR CE). Of course, this strategy is only valid for operators who usually have several operators on duty.

Subsequently, in the ‘’end of lockdown’’ and ‘’second lockdown’’ phases, the strategy differed between operators. Those who had the possibility to gradually increase the number of operators did so, while others had to maintain a reduced number

PC MOBIRIS – CME MOB

État	Fonctionnement	Impact sur l'exploitation	Mesures compensatoires
Nominal	L'opérateur trafic et l'opérateur technique (polyvalent) sont en poste et les 2 Postes de Contrôle-Commande (CCN et Gulledelle) sont exploitables		
Dégradé Tolérable	Un opérateur polyvalent est le seul en poste.	La permanence Mobiris est en service minimum et ne permet plus une exploitation optimale	*Appel à l'astreinte Mobiris pour demander d'envoyer un autre opérateur ou déplacement de l'astreinte au PCC*
Dégradé critique	1 des PCC est inexploitable (*) ou doit être évacué (Incendie, inondation, attentat...) Mais l'autre PCC est exploitable	Exploitation possible uniquement depuis 1 PCC	Si un opérateur polyvalent est présent à l'autre PCC disponible alors il peut reprendre l'Exploitation. *Si un opérateur polyvalent est absent au PCC disponible, les tunnels de plus de 200 m et assimilés doivent être fermés en attendant son arrivée.*
Dégradé avant fermeture			
Conditions Fermeture	Pas d'opérateur polyvalent à la permanence	Exploitation des tunnels impossible	*Fermeture des tunnels de plus de 200 m et assimilés*
	Les 2 PCC Mobiris sont inexploitables (*) ou doivent être évacués (Incendie, inondation, attentat...)		

(*) Note :

Une salle de permanence inexploitable est une salle :

- Qui ne respecte pas une des conditions du Code du bien-être au travail ;
- Où tous les moyens de communication téléphoniques (téléphones normaux, de secours, téléphones noirs du réseau tunnel, GSM professionnels) sont indisponibles.

Figure 6 - CME Mobiris Brussels Mobility

of staff. The geographical location of operators may be a first explanation for these differences, as the pandemic spread unevenly over the territory with varying consequences both on the affected population and on traffic.

4.2.3 Closing the structure

In certain traffic situations or due to a strong reduction in staff, some operators have considered closing the tunnel concerned during night or weekend periods.

Still others chose to close the tunnel because an alternative route was available to absorb the traffic at that time.

Feedback: Coping with the reduction in personnel by activating the emergency response centres and adapting the surveillance level: DIR MED (1st confinement)

It should be remembered that the PC manages the network and the tunnels. The most important and most complex structure is the L2. It operates in a cycle of 3 shifts of 8 hours with two operators systematically. To face the situation during the containment, the DIR MED proposes 3 levels of measures:

The first level of measures consists of maintaining normal PC activity (with two operators), by calling on resources other than those of the operators in post: recall of former operators who have recently been transferred, recourse to the room managers and the head of the CIGT (traffic engineering and management centre) and the possibility of having a degraded shift on an occasional basis (1 shift with one operator between two shifts with two operators).

The second level of measures consists of managing a degraded mode with a single operator. It is based on the use of emergency PCs, which can take over the monitoring of part of the network. Thus, the Gap control room can take over the operation of the Laffrey site and the Nîmes operations centre can be activated to take over the events of the Rhône Cévennes District. In this way, the operator's workload is lightened and he only manages the L2. In addition, the CIGT and Urban District on-call teams are alerted in the event of significant events.

The third level of measures involves the partial closure of the L2 (by closing one lane) in case all shifts cannot be filled. In addition to the closure, information measures are taken, such as informing all on-call managers and the zonal road unit about the absence of staff at the HQ. This level has never been reached.

Feedback: Coping with downsizing by adapting MECs and the level of surveillance: Brussels Mobility (1st containment)

Brussels Mobility manages the Mobiris operations centre located in the area of Brussels North station. The centre manages the road network providing access to the city and the tunnels located on this network, i.e. 13 tunnels over 200 metres long. There is a permanent presence of two operators. Historically, a Mobiris CME provides for the tunnels to be closed in the event that the operators or the supervision room are unavailable. This CME for the unavailability of the room has been activated on several occasions: an attack, a bomb threat, a suspicious package in the Gare du Nord station where the PC is located. For several years, the creation of an emergency centre or back-up centre had been requested. The pandemic provided the opportunity to create this centre outside the Brussels hypercentre, using a former gendarmerie already equipped with IT networks. Mobiris' strategy is based on three levels of measures.

The first level of measures is the duplication of teams thanks to the creation of the back-up centre to limit contamination. If a team at the main PC is unavailable, the other team at the back-up PC can take over immediately with the support of the supervisors.

The second level of measures concerned the personnel who could replace the operators. If both teams are unavailable, it is planned to use management staff. The third level of measures is to call on volunteer administrative staff who have been trained as operators.

Finally, the last level was to consider, if the number of staff was too low, to limit the periods of surveillance by closing the tunnel first at night and then, if necessary, at weekends.

4.3 Coordination between actors in case of an event

The SIP provides for coordination between the actors involved in the event of an event in the tunnel; this coordination is materialised in the Synoptic Action Tables (SATs) which identify the actions to be carried out by each actor to manage the events (fires, accidents, breakdowns, etc.).

The pandemic and the drop in traffic did not prevent operators from having to manage sensitive events (breakdowns, accidents), even if their number was lower.

The impact of the pandemic on coordination with third parties (in particular emergency services and law enforcement agencies) is an issue that will be examined in greater depth, as it must take into account the organisational adaptations not only of the operator but also of all the other players. In the following section, this subject is addressed solely from the angle of the organisation and performance or otherwise of annual safety exercises (see section 5 on safety exercises).

5 Pandemic and security exercises

In addition to the activities and tasks described above, the operators also had to carry out the tasks imposed by the regulations, i.e. safety exercises and training.

5.1 Safety exercises

Safety drills are not part of the daily operation of tunnels but are a French regulatory requirement for tunnels longer than 300m. These exercises must be carried out annually and must give rise to formalised feedback.

In bi-national tunnels, specific agreements set the exercise policy.

In addition to these regulatory considerations, safety exercises are an essential part of the safety process. In particular, they allow the simulation of infrequent situations, the testing of the operator's procedures, those of third party services (notably law enforcement and emergency services) and the proper coordination between all the players.

The duration of the health crisis over almost the whole of 2020 has of course disrupted the conditions for carrying out the planned exercises.

Postponements of safety exercises

- Example: Fréjus Tunnel - SFTRF: The exercise was to be organised by Italy in May 2020. After a decision to postpone it until September, it was finally decided to cancel it.
- Example A86 - Cofiroute: On the A86, the fire brigade was instructed to remove all non-priority missions.
- Example Greater Lyon: In Lyon, the second half-year exercise was a civil security exercise and the Prefecture preferred to cancel it.
- Example Brussels Mobility: In Belgium, exercises are not compulsory but have been recommended for 1 or 2 years. The exercise envisaged had an ambitious scenario, an accident with a major traffic jam and a vehicle that managed to get through and caught fire in the tunnel. It was planned for November 2020, but was postponed to the first half of 2021 and then to the second half of 2021. As the scenario required a lot of organisational work, the operator would like to keep it rather than develop a new one.

The testimonies collected during the WGFE, and supplemented by some interviews, show a diversity of arrangements during 2020.

5.1.1 Carry-over or cancellation of exercises

At the beginning of 2020, a large majority of operators had started to plan their exercise(s), including dates and draft scenarios. Several field exercises were either cancelled altogether or postponed to later in the same year, only to be postponed again or even cancelled permanently. Since the exercises are annual, it is clear that a postponement of one year leads to an ipso facto cancellation.

It should be noted that some operators were able to carry out exercises on one part of their network and cancel them or postpone them to another part of the network. These different choices were guided by the operating context, decisions taken by external actors or competent authorities or by the nature and scale of the exercise initially envisaged.

5.1.2 Exercises with adaptations

Framework exercises

The main adaptation was the transformation of field exercises into framework exercises.

The framework exercises planned from the outset have been maintained.

Adaptations to the scenario were necessary, including for the indoor exercises:

- Modification of the scenario and/or location of the exercise (depending on the availability of the actors)
- Adaptation of the place of exercise
- Adapting the number of people to the new room capacities
- Physical distancing, wearing of masks, use of hydro-alcoholic gel, cleaning of equipment, etc.

Regulatory exercises adapted to the situation: Framework exercise

- Example Somport Tunnel: The second exercise became a framework exercise in small groups with 6 people according to the rules in the province of Aragon, the other actors participated by telephone
- Example Grand Lyon: For the implementation of the planned framework exercise, two rooms were provided, one for the PC actors and the other for the field actors. In addition, a model to visualise the tunnel was set up for the simulation.
- Example ASF A89: The initial exercise was a large-scale exercise. The scenario was modified to test the business continuity plan and the activation of the emergency PC. As the meeting room had limited capacity, a video observation was also planned for the link between the PC and the animation room.
- Example APPR- A89 The initial exercise was a NOVI (mass casualty) exercise. It was decided to transform the exercise into a framework exercise and to test the alert for three successive scenarios at one hour intervals with three major events (fire, accident and dangerous goods). The exercise was stopped once the alert was correctly given. The actors remained in their departments with their own observers. The operator did his internal debriefing in person as there were only 5 people and the cold debriefing was done by video conference.

The examples presented show that everyone tried to do the best they could with the means and resources they were able to mobilise.

Field exercises

The field exercises that could be maintained were mainly carried out with a limitation of the number of persons and/or the number of observers and sometimes with a modification of the debriefing location.

Other measures could also be implemented depending on the context of the structure:

- Limitation of the number of people per type of actor or even limitation to the services essential for the exercise to take place
- Replacement of extras with dummies or posters
- Changes to the debriefing process
- Use by services of their own vehicles to get to the tunnel
- Elimination of the usual post-exercise snack.

Overall, despite the health crisis, operators carried out exercises, but these were limited in scope.

Regulatory exercises adapted to the situation: Field exercise

- Example STRF - Orelle Tunnel: The initial exercise was a mass casualty exercise and the scenario was not changed. The limitation of the number of people allowed to mobilize 4 observers instead of 20 and the number of people on the ground usually around 60 was limited to 3 drivers and 2 dummies representing the seriously injured. There was no IT on-call.
- Example DIR MC - Lioran Tunnel: The initial exercise was a vehicle accident with a bus containing passengers. Only the bus driver, the LV driver and a passenger in the LV were present. The condition of the bus passengers was simulated by a placard placed on their seat in the bus.
- Example Mercureaux Tunnel - DIR E: The hot debriefing took place only with the fire brigade, without the prefecture and in the CIGT courtyard.
- Example A86 Duplex - Cofiroute: The September exercise was carried out and the hot debriefing was carried out in the fire brigade's PC truck, which allowed the social distance to be respected and not to be confined in a room.
- Example Luxembourg: In Luxembourg, the exercise always takes place on the same axis but on a different tunnel each time. The planned exercise was not changed and all those invited carried out or attended the exercise. Due to the rain, the debriefing took place at the head of the tunnel.

Example DIR MED: The 2020 exercise was a large-scale exercise which was transformed into a light exercise and organised at the beginning of 2021. The 2021 exercise will be carried out at the end of the year.
Example ESCOTA: The Prefecture considered that due to the context (health crisis + storm Alex) the exercises would not have to be postponed.

5.2 Training

The regulations require the operator to ensure that its staff have a level of training commensurate with the tasks entrusted to them.

During the pandemic, training courses that had been planned were often postponed. The organisers tried as much as possible to compensate for this by developing distance learning courses.

Some operators (e.g. Mobiris), due to a lack of visibility on the future, have started to train other (administrative) staff to enable them to provide assistance in tunnel surveillance.

This topic was not developed at the WGFE meeting. It will be discussed further at a later stage.

6 First lessons learned

This section presents the main feedback that can be drawn from the contributions and discussions at the GTFE.

6.1 On the organisation of operators

The important role of human resources: Operators were unanimous in pointing out that human resources have been essential in adapting their organisation. They also pointed out the additional workload that this has created.

Acceptance of health protocols by staff and subcontractors, but vigilance with third parties: the implementation of a health protocol by the operator was, for the most part, accepted without any problem by its staff and by the subcontractors present on the site. However, it is more complicated to apply these same protocols to the agents of third-party organisations. This is the case, for example, when in some PCs law enforcement agencies share the same working environment. This is also the case in the context of exercises, when the instructions on limiting the number of people per organisation are not respected by all those involved.

Vigilance over the methods of communication between agents: the modes and methods of communication have had to evolve, particularly for certain agents such as operators who have found themselves physically separated. Thus, for them, written communication (e-mail) has become more important and videoconferencing has sometimes had to be used despite the connection problems sometimes encountered.

Setting up teams of back-up operators: In order to ensure continuity of service, some operators have tried to set up a "team of back-up operators", for example by using former operators who have recently transferred within the same structure.

Feedback from the first containment: DIR MED

The surveillance of the L2 ring road and its many tunnels requires a particular skill that must be maintained. The pandemic has shown that the use of former operators who have transferred within the DIR is useful, but the loss of skills can be rapid. It is therefore planned to maintain the skills of the agents who have been transferred by asking them to return one day per quarter to the operator's post: **this is the reserve service**. It will be interesting to share feedback on this provision.

Maintaining the skills of the teams of reserve operators: for operators to be operational, their skills need to be regularly refreshed. This situation encountered by some operators raises the question of the training plan for the members of this reserve team, whose main task is no longer to monitor the tunnels.

6.2 In terms of monitoring and exercises

Interest of an emergency headquarters: the presence of an emergency headquarters can make it possible to split the teams, on the one hand to ensure the continuity of the surveillance mission and on the other hand to isolate agents and limit the risks of contamination.

Consideration of **traffic level in the definition of MECs**: Operators used the "human resources" MEC and operated in degraded mode when traffic was low. As a result, some of them are considering adapting their MECs by relating the traffic level to the number of operators present. These MECs are complemented by specific instructions, compensatory measures and/or tunnel closure.

Feedback from the first containment : Brussels Mobility

The usefulness of the creation of an emergency centre combined with the doubling of the teams was demonstrated. The containment and the associated sanitary measures thus made it possible to demonstrate the usefulness of the project to reorganise the Brussels Mobility HQ and to make it a reality: the relocation of the main HQ away from the North Station was confirmed and the reinforcement of the emergency HQ

Finally, Brussels Mobility has planned to reflect on the organisation by having two usable PCs and to review the intervention procedures.

Vigilance over the ambition of the exercises and their training role: although most of the exercises could be carried out, the scenario was generally adapted to be less ambitious than expected, with fewer services involved or simplified or shortened procedures (for example, the fire brigade did not carry out the entire evacuation exercise). If this crisis persists, the exercises may no longer be as enriching for all the actors involved in the real situation and thus no longer play their training role.

6.3 To conclude

The periods of containment were complicated, particularly in terms of taking into account all the constraints while continuing to carry out essential missions.

The health crisis showed that the operators reacted effectively and continued to operate their facility(ies). This confirmed the professionalism of all their staff, their sense of public service and their ability to put in place an often innovative and resilient organisation.

At the time of writing (spring 2021), the pandemic is still with us and requires operators to continue to adapt on a day-to-day basis to health guidelines that may differ from one jurisdiction to another.

Other lessons have yet to be learned and the CETU proposes to look further into the subject of road tunnel operation during a health crisis (see box opposite). It will continue to monitor and analyse the evolution of the situation based on feedback from operators. This analysis is particularly useful to draw lessons and share them.

Actions still to be taken

The CETU proposes to examine in greater depth the subject of road tunnel operation during a health crisis by identifying and analysing new practices, assessing feedback and making the most of the main lessons learned.

Without being exhaustive, the prospects for work include, but are not limited to

- Identification of core tasks,
- The conduct of maintenance activities,
- Event management,
- Field interventions (maintenance, patrols, etc.),
- The medium (and long) term impact on the organisation documents of the operation (SIP, CEM related to human resources, etc.),
- The psychological impact,
- Training.
- …

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