

# Fighting Against COVID-19

## Brief Countermeasures Report of Daejeon Metropolitan Express Transit Corp.(DJET)

April 2020.



United Cities and Local Governments  
Asia-Pacific



Daejeon Metropolitan City,  
Republic of Korea



Daejeon Metropolitan Express Transit  
Corporation, Republic of Korea

## About UCLG ASPAC

UCLG ASPAC is the largest regional section of the United Cities and Local Governments (UCLG), a worldwide association and the only local government organization recognized by the United Nations. UCLG was established on 01 January 2004 and is headquartered in Barcelona, Spain. UCLG ASPAC was established in Taipei on 14 April 2004. UCLG ASPAC is the key knowledge management hub on local government issues in the Asia Pacific region. Its scope of work includes advocacy, capacity building, policy and research, programme and projects, and decentralized cooperation.



The Asia and Pacific region has linkages to more than 7,000 local governments. It represents well over 3.76 billion people, making up more than half of the world's population, and incorporates economically fast developing countries such as China, India, and Indonesia.

UCLG ASPAC members are mostly individual city and local governments and their associations. UCLG ASPAC Secretariat is hosted by the Capital City Government of Jakarta, Indonesia. Daejeon Metropolitan City is one of its members.



## **Congratulatory Remarks of Secretary General, UCLG ASPAC**

The COVID-19 pandemic is affecting millions of people around the world. As of 12 April 2020, over 1.6 million confirmed cases, including more than 100,000 deaths, have been reported to the World Health Organization. Its magnitude as a public health and economic crisis has changed the way we work and live. It threatens the most vulnerable groups in our communities, women and children, people with disabilities, and the elderly, putting them at the greatest risk.

Cities are at the front line in the mitigation and response efforts against COVID-19. Data and information on the disease and how to manage it at the local level becomes crucial for city leaders and officials to enable them to make evidence-based decisions in a timely manner. United Cities and Local Governments Asia Pacific (UCLG ASPAC) has been sharing the experience of cities and local governments in dealing with the COVID-19. We have also produced a brief guide on what local governments need to know about COVID-19 and their lessons learnt as well.

We congratulate Daejeon Metropolitan City, our active member, and its public corporation Daejeon Metropolitan Express Transit Corporation (DJET), for producing this report and sharing the experience of DJET in tackling the pandemic in public transport. The report contributes to the growing knowledge resources in the field and gives practical measures in response to the disease outbreak.

As mobility is our priority, I hope the experience of DJET will be useful for other cities and local governments in minimizing the impact of COVID-19 in the public transport sector, especially in subways and other mass rapid transit systems.

Let us do our share in addressing one of the biggest challenges that the world has faced in the 21<sup>st</sup> century. With informed governments and stakeholders, we can better work together increasing safe and healthy cities and communities.

April 2020

**Dr. Bernadia Irawati Tjandradewi**  
**Secretary General, UCLG ASPAC**





## <The Mayor's Announcement for Plea to the Citizens>

My beloved Daejeon citizens.

With the COVID-19, our city and society as a whole are facing a difficult time.

Our City will make all-out efforts to prevent the spread of the disease in our community.

First, with early detection of patients and systematic management of isolationists, we will be fully prepared for the surge of confirmed cases.

To increase citizen's test accessibility, we will have drive-through testing on a district-by-district basis, and we will expand our epidemiological response team.

We set up a quarantine inspection team to monitor them four times a day with 119 vehicles, and sternly deal with violators of quarantine rules, including compulsory isolation.

Second, I will do my best to manage the stable supply and demand of the face mask. One of the things that citizens most desperately want is to get a mask. I'm sure you've been confused and uncomfortable for a few days because of poor supply and demand.

Although the government's export restriction and expansion of public sales expected to be normalized next week, the Daejeon City will secure 20,000 or more per day from Monday through local market, especially in addition to the government supply chain, to provide to the vulnerable, such as the disabled, the elderly, and others.

We will also operate a joint inspection team with the Fair Trade Commission and the Food-Drug Administration to crack down on unfair trading practices such as cornering and price fixing to stabilize the health products market.

Third, action plans for Shincheonji church, a risk factor for the community, would be carried out continuously

For 12,335 believers in Shincheonji, 100 dedicated officers were deployed to complete the entire survey for two days from the 27<sup>th</sup> to 28<sup>th</sup> of February, 2020

The 167 cases were quarantined immediately and the medical center will complete the examination as soon as possible. 12,107 people with no symptoms are also under close active surveillance.

We will also keep track of the facilities and identities of Sincheonji until the end, through police cooperation and citizen information, and we will take stern measures such as filing a complaint against the responsible person, shutting down the facility, further quarantine, and canceling the corporation for the purpose of covering up and missing the list of facilities.

Fourth, we will come up with measures to restore the vitality of small businesses and the local economy, which have been weakened by the COVID-19.

Under the recognition of an economic emergency, we will seek all financial measures to reflect the needs of the field to revitalize the local economy.

Within the first half of the year, we will quickly implement 3 trillion won, 65 percent of the consumption and investment sector budget, make full use of reserve funds and various funds to support quarantine, and draw up an emergency supplementary budget for the economy of the working class.

We will also seek win-win measures for small businesses owned by public institutions, including a reduction in service fees and a grace period of six months.

Finally, I would like to express my heartfelt gratitude to the numerous health care officials, police officers, and firefighters who are fighting against the virus at this time. I will do my best until the end with you.



29 February, 2020, Mayor Taejeong Huh of Daejeon Metropolitan Government.

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## **FORWARD of CEO, DJET**

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**W**e, DJET, faced a serious crisis as 3 of our staff was diagnosed with COVID-19 in the last week of February. In response to this unprecedented situation, we implemented emergency closure from 26 February to 28 February and isolated a total of 95 staff, including the 3 confirmed cases.

Currently, those 3 confirmed cases are in good condition and are being treated at the local designated clinic. 56 Primary contacts also tested negative, and the rest including secondary contacts, have returned to work after keeping the quarantine period. Until now, no additional infection has been reported among our employees.

Stations in which the COVID-19 patients worked had been sterilized quickly and precisely after the emergency closure. Now they are operating normally without causing any inconvenience in the services and safety of the passengers.

We are taking steps to enhance our emergency management system. To prevent civil damage as well as work paralysis due to the pandemic, we have strengthened the sterilization of both stations and rolling stocks, and conducted onsite centered service amendment of staff. Also, with the support of Daejeon Metropolitan Government, thermal imaging cameras were installed throughout the whole 22 stations to relieve citizens' anxiety since March.

As a local public corporation, we are fulfilling our social responsibilities by carefully reviewing and preparing practical support measures for citizens suffering from spread of COVID-19, such as lowering of rental fee and rapidly executing the budget.

Positive prospects recently emerged as to whether the epidemic crisis has begun to settle down. However, we will remain vigilant until we completely overcome the pandemic. We are also taking this opportunity to improve our systems and policies.

This report was written with the hope that other domestic and foreign counterparts to overcome the COVID-19 crisis wisely by utilizing our experiences.

April 2020

Gyeng Chul KIM  
CEO, Ph.D., P.E.



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# 1 How COVID-19 Became a Huge Threat to Us

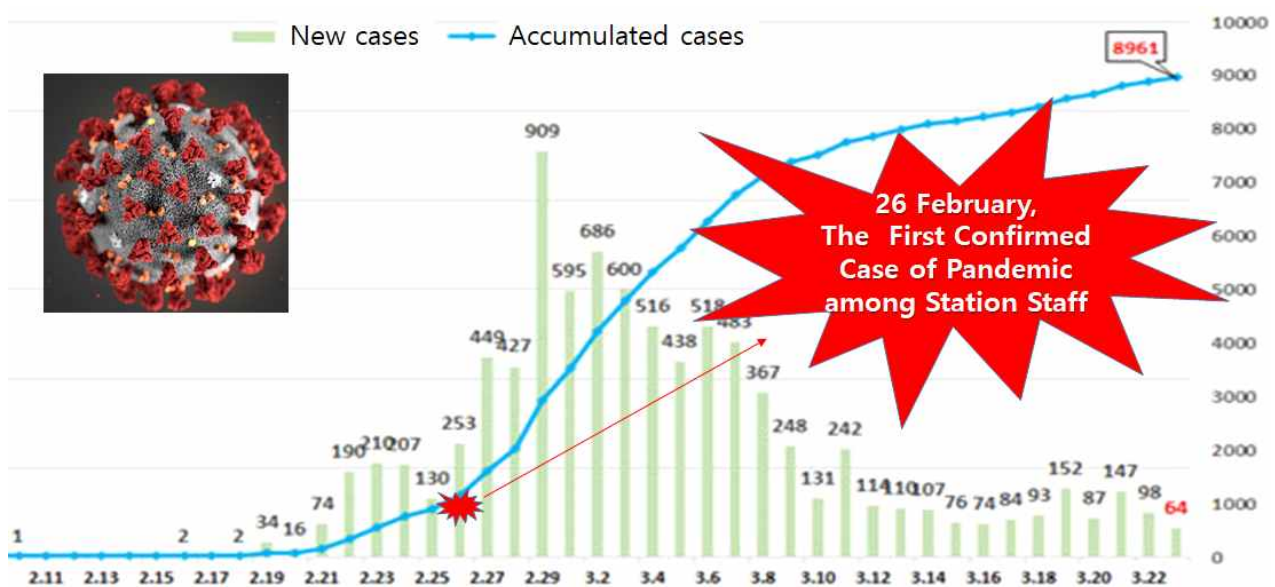
## DJET never imagined COVID-19 infection

South Korea reported its first confirmed case of COVID-19 on 20 January 2020 with 6 secondary patients on 30 January, after the outbreak in Wuhan City, Hubei Province, China, in December 2019. Then powerful diffuser(No. 31 in Korea) related to Shincheonji Church emerged, causing the rapid spread of the virus nationwide, mainly in the city of Daegu and the vicinity. DJET also started the emergency system by establishing a Disaster Response Division to deal with COVID-19, right after the government upgraded its infectious disease crisis alert level from “risky” to “serious.”

It was a month later, on 21 February, when Daejeon first reported its first confirmed case of COVID-19. With 1 more patient coming down with this virus each day, DJET faced a crisis on 26 February, when the staff of Wolpyeong Station of DJET line #1 was confirmed with the disease.

2 more staff, including the Station Manager of Dae-dong/Jungangno who had been in close contact with the patient, and a station worker who was on the night shift with the patient, came down with the virus successively, resulting 3 in total infected with COVID-19.

DJET was seriously exposed to the possibility of COVID-19 mass infection, and it raised a gross problem for us, as our public transport was an essential service for the citizens.



<Confirmed Cases of COVID-19 Outbreak in Korea and DJET(from 10 February to 22 March)>

## 2

## The Process of the First Case Being Confirmed

The initial symptoms of COVID-19 are so slight that it is difficult to notice infection

The first confirmed case of DJET is believed to have been infected on 15 February, while traveling via Daegu Airport, which was a dangerous place to be in since COVID-19 was radically spread out there already. The patient arrived at Daejeon Station at 23:20 on 17 February by using Jeju and Daegu airport. Starting the following day, the patient worked on the night shift for 3 days, on 18, 20, and 22 February.

There were no symptoms in particular when the patient came back to work on 18 February.

However, with a simple fever, the patient suspected COVID-19 infection on 22 February with only a clue that she had visited Daegu, a COVID-19 infected area. The patient visited the local hospital and designated clinic and was prescribed with cold medicine after exhibiting a mild fever (37.5°C) and swollen neck. She left the office on sick leave during her night shift on 22 February.

The patient couldn't be tested although she visited Seo-gu Community Health Center the next day. After self-isolation of 2 days, she got tested for COVID-19 on 25 February, finally being confirmed on 26 February and was admitted to a nearby university hospital.

**대전시 코로나19 확진자 이동경로**  
**1257번**

**확진자 전술에 따른 이동경로(2. 20 ~ 2. 26)**  
※ 이동·군무 중 마스크 상시 착용

<b>20 (목)</b>	[17:00] 자택(오정동) 근처 오정동농수산물시장(오정동) 승강장 → 버스(002번) → 진타래아파트 승강장(월평동)
	[18:00] 월평역 / 야간군무
<b>21 (금)</b>	[09:00] 월평역 → 선릉같은오늘(청주 가경동) → 자택(자민 자가용 이용)
<b>22 (토)</b>	[13:00] 자택 → 하나로이비인후과의원(중리동) → 한아름약국(중리동)
	[14:30] 근로복지공단대전병원(선별진료소)(법동) → 자택
	[17:00] 월평역(자가용) / 야간군무
	[23:30] 월평역 → 자택(자가용)
<b>23 (일)</b>	[13:00] 자택 → 서구보건소(선별진료소) → 자택(자가용)
<b>24 (월)</b>	[종 일] 자택
<b>25 (화)</b>	[14:00] 자택(자가용) → 유성우리아이비인후과(봉명동)
	[16:00] 대덕구보건소(선별진료소) → 자택(자가용)
<b>26 (수)</b>	[16:00] 자택 → 충남대병원 입원

※ 확진자 기역을 바탕으로 확인된 동선으로 역학조사 결과에 따라 수정사항 발생할 수 있음.  
- 동선에 따라 방역조치 완료되었습니다.

대전광역시

<The Public Information on the movements of the First Infected Staff, Daejeon Metropolitan City Authority>



<Wolpyeong Station Closed>



<Station Office Closed right after the staff COVID-19 infection confirmed>



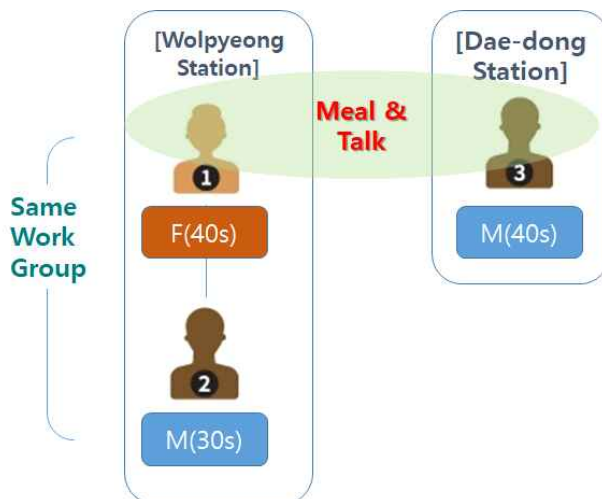
<Gateway Closed & Sterilized>



### 3 Routes of Infection between Confirmed Cases

The virus can easily spread with just a simple touch

2 additional cases from DJET were reported after being in contact with the first infected staff.



<Infection Contact Diagram of DJET staff>

The 2nd confirmed case was from the same shift at the same station with the first patient.

It was assumed through identification of their movements that the second patient was infected while working together with the first case on 18, 20, 22 February.

Slight throat pain developed with the second patient on 23 February and he started self-isolation from 24 February. The symptoms were the same as those of the first case, with mild fever and cold.

2 days later he tested at Seo-gu medical clinic, and was diagnosed with COVID-19 on 27 February, the day after the test.

대전시 코로나19 확진자 이동경로	
1788번 (대전 10번)	
확진자 진술에 따른 이동경로(2. 22.~2. 27.)	
22(토)	[18:00] 자택 → 도보 → 월평역 / 야간근무
23(일)	[종 일] 자택
24(월)	[08:50] 자택 → 월평역(근무) / 도보 [16:40] 월평역 → 자택 / 도보
25(화)	[종 일] 자택
26(수)	[17:00] 자택 → 서구보건소(선별진료소) → 자택 / 택시
27(목)	[13:00] 자택 → 충남대병원

<The Public Information on the movements of the 2nd Infected Staff,

Daejeon Metropolitan City Authority >

The office of the 3rd patient was Dae-dong & Jungangno Station, which were more than 10kms away from the first patient's station.

The points of contact were brief mealtime and interview inside the station office at Wolpyeong Station. From this case, it became clear that contact time and number were meaningless, while avoiding face-to-face contact is the most critical in prevention.

The 3rd confirmed case quarantined himself immediately after the first case was confirmed with infection on 26 February. He tested 'positive' and was hospitalized on 28 Feb, after the test at 22:00 on 26.

This is how the number of DJET's COVID-19 infected staff had increased to 3 just in few days after the first confirmed case emerged.

### 대전시 코로나19 확진자 이동경로

#### 1913번 (대전 11번)

확진자 전술에 따른 이동경로(2,21 ~ 2,26)

※ 이동 : 근무 중 미스크 신시 작업

**21(금)** [08:30] 유성온천역(백무성) / 근무  
[09:30] 유성온천역 → 월평역 → 청주 → 유성온천역 / 자차  
[19:00] 유성온천역 → 은누리교회(문산동) → 자택 / 자차

**22(토)** [08:00] 자택(원산동)  
→ 한국전력공사 전력연구원 운동장(문지동)  
[11:00] 한국전력공사 전력연구원 → 소망교회(갈매동) / 자차  
[ ] 자택 / 자차

**23(일)** [08:20] 은누리교회(12:40 예배) → 자택 / 자차

**24(월)** [08:25] 자택 → 유성온천역 / 자차  
[ ] 유성온천역 → 대동역 / 지하철  
[14:00] 대동역 → 중앙로역 / 지하철  
[ ] 중앙로역 / 근무  
[18:25] 중앙로역 → 유성온천역 / 지하철 → 자택 / 자차

**25(화)** [08:30] 자택 → 월평역 / 자차  
[08:55] 월평역 → 중앙로역 / 지하철(근무)  
[11:30] 중앙로역 → 대동역 / 지하철(근무)  
[18:00] 대동역 → 월평역 / 지하철(근무) → 자택 / 자차

**26(수)** [08:35] 자택 → 월평역 / 자차  
[09:00] 월평역 → 대동역 / 지하철(근무)  
[11:40] 대동역 → 블루카운(신안동) / 도보  
[16:30] 대동역 → 갈매역 인근 / 택시  
[ ] 갈매역 인근 → 자택 / 자차  
[18:00] 자택 → 유성선병원(선별진료소) / 자차  
[22:10] 유성선병원(선별진료소) → 논산 원룸(자가격리) / 자차

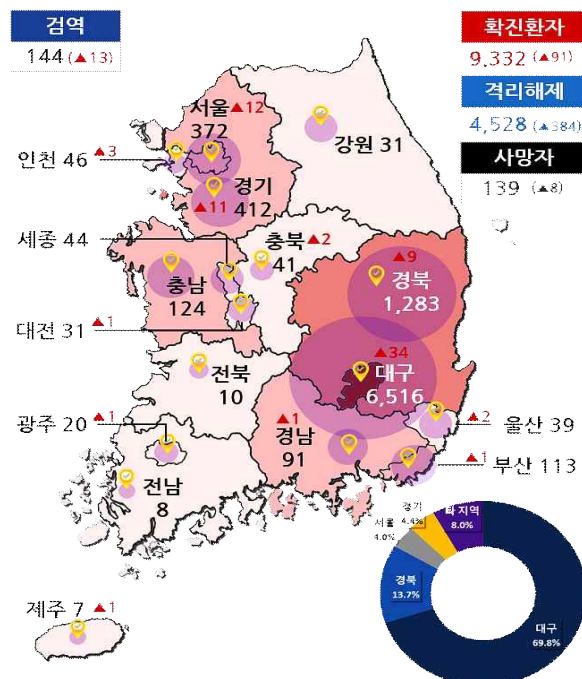
※ 확진자 기이름을 바탕으로 확인된 등진으로 역학조사 결과에 따라 수정사항 발생할 수 있음.  
- 등진에 따라 일부 위치 간에 변경

대전광역시

<The Public Information of the movements of the  
2nd Infected Staff,  
Daejeon Metropolitan City Authority >

#### <COVID-19 Occurrence Status in Korea>

27 March



#### <Local COVID-19 Occurrence Status in Korea>

지역	누계 *3,27(금) 0시 기준						인구10만명당 발생률
	확진자 수	비율(%)	3,26(목) 0시 기준 비교 시 증가 수	격리중	격리해제	사망	
서울	372	4.0%	▲ 12	283	89	-	3.82
부산	113	1.2%	▲ 1	30	81	2	3.31
대구	6,516	69.8%	▲ 34	3,094	3,324	98	267.43
인천	46	0.5%	▲ 3	33	13	-	1.56
광주	20	0.2%	▲ 1	9	11	-	1.37
대전	31	0.3%	▲ 1	22	9	-	2.1
울산	39	0.4%	▲ 2	19	20	-	3.4
세종	44	0.5%		35	9	-	12.85
경기	412	4.4%	▲ 11	277	131	4	3.11
강원	31	0.3%		10	20	1	2.01
충북	41	0.4%	▲ 2	24	17	-	2.56
충남	124	1.3%		46	78	-	5.84
전북	10	0.1%		3	7	-	0.55
전남	8	0.1%		5	3	-	0.43
경북	1,283	13.7%	▲ 9	599	650	34	48.19
경남	91	1.0%	▲ 1	29	62	-	2.71
제주	7	0.1%	▲ 1	3	4	-	1.04
검역	144	1.5%	▲ 13	144	0	-	-
합계	9,332	100%	▲ 91	4,665	4,528	139	18

www.cdc.go.kr

## 4

# When Employees were Diagnosed with COVID-19

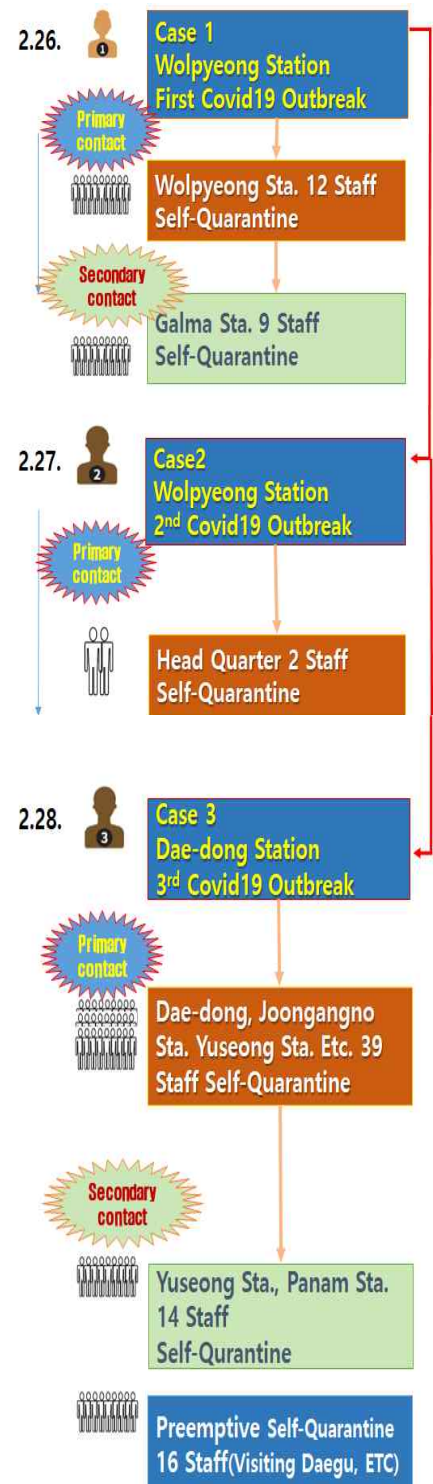
Considering the strong contagiousness of COVID-19, it is necessary to immediately and proactively select the contacts and exclude them from work

The DJET Disaster Response Division did not wait until the 1st patient was confirmed with COVID-19 on 26 February before taking action. During her quarantine, the division already conducted its contact tracing beginning 18 February from the patient's visit from Daegu City and advised self-isolation measures on primary and secondary contacts.

Starting from 26 February when the first patient was confirmed, the focus had been on the second and the third DJET staff who contacted her the most. The Division selected the inventory of workers to be excluded from work, focusing on the contacts of 2nd and 3rd cases, and compelled quarantine on them at the same time. DJET excluded 95 employees from work in total through self-isolation.

In addition, a full extent internal survey was conducted within DJET, investigating visitors from Daegu City and those related to Shincheonji Church and its infected facilities.

The work-exclusion group was categorized into the primary contact and the secondary contact centered on the 3 confirmed cases. 54 primary contacts were classified as health screening subjects who were being checked up at least twice a day by the Health Division of the City.



<Time Line of Measures to the Internal Contactors>

For secondary contacts, self-quarantine was released progressively if the primary one had tested negative.

Moreover, DJET conducted measures to have quick checkups for some with symptoms, whom were informed no need for COVID-19 test from the designated public health center earlier. When prompt checkup is required among the DJET's Disaster Response Division, the checkup fee is provided to the personnel, making it easier to quickly return to work.

With a large number of absence of onsite services staff due to the rise of patients and quarantines, the Disaster Response Division mobilized its employees with onsite experience and relocated them. They also distributed headquarters' staff to each station to augment worker shortage in advance. With the staff reallocations, all 22 stations have maintained normal operations.

제 목: 코로나19 진단검사비 지원 계획

문서번호	재난대응본부-111	담당	김정	승인일자	부본부장	본부장
보통기간	10년	주요종	김규중	검정승	김민수	03/08 김정민
문제일자	2020.03.06.	원	노무부지정 이희태(소장)	이희태	이희태	
문제여부	승인	조				

- 코로나19 직원 감염에 따른 -

### 진단검사비(검체 채취검사) 지원 계획

요 약

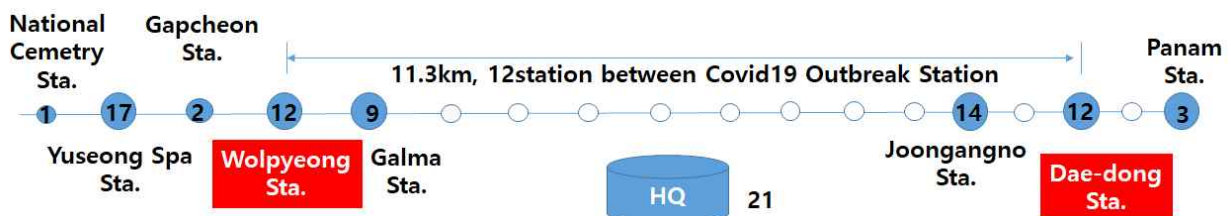
- (현황) 사내 '코로나19' 관리인원 / 총 95명(32.21시 기준)
- 무상 / 보건소 검사 52명
- 유상 / 민간병원 등 검사 11명
- 노 기타 검사원 격리 해제 등 32명
- (지원) 접촉자가 민간병원에서 검사를 받은 경우 검사비 지원
- (효과) 신속한 검사로 공사 구성원 보호 및 안정적 인력운영

DJET 대전광역시도시철도공사  
재난대응본부

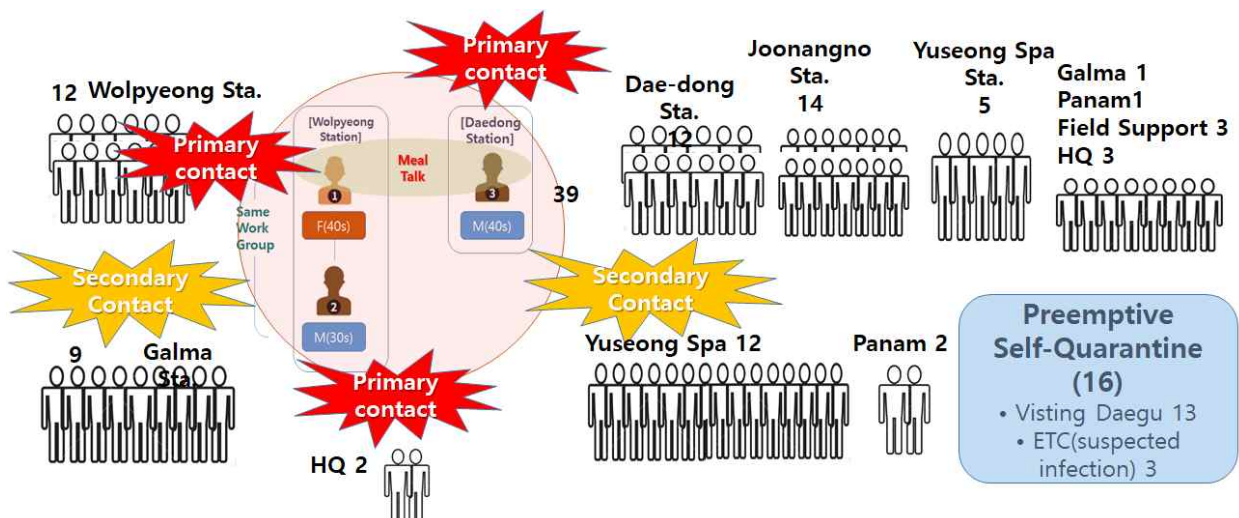
<The Plan of Supporting the  
Checkup Fee>



<The Procedures of Supporting  
the Checkup Fee of DJET Staff>



<The Number of employees excluded by location>



<Status of task exclusion according to confirmed infection route>



## 5 How Triage and Work Exclusion were Conducted

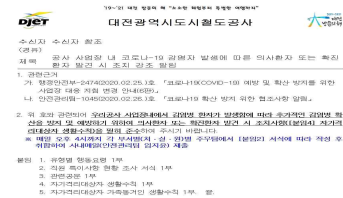
### DJET implemented quarantine and release with clear criteria of work exclusion

A total of 95 staff, including every staff who were in contact with the 3 confirmed cases and their respective contacts, the visitors from Daegu City(infection-prone area), and the people related to the Shincheonji Church or have visited its facilities, were excluded from work by self-isolation.

Right after the first DJET confirmed case showed symptoms, sick leave and self-quarantine were carried out on 22 February. At the same time, the Disaster Response Division of DJET cooperated with all other company departments to identify the movements of the first case. The Division disclosed those information to all employees through SNS and disaster text messages to prevent further infection. The list of employees with primary contact and their symptoms was quickly secured.

The triage of staff for work exclusion was conducted in accordance with clear principles and criteria. Moreover, the Division ensured the confidentiality of confirmed cases and their contacts, as well as the people affiliated with the Shincheonji Church, in order to prevent human rights violations. It was stated explicitly that the Division prohibited wild rumors and discrimination about those people. Leak of documents related to the patients to unauthorized was also strongly forbidden.

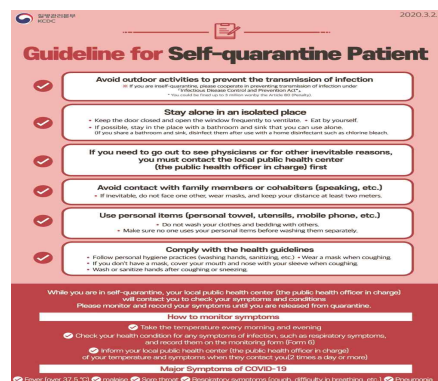
DJET notified all employees of the inventory of whom are excluded from work and highlighted the actions and reporting procedures in case symptoms of the disease may arise. Prevention measures were also provided to the family members of the staff in self-quarantine.



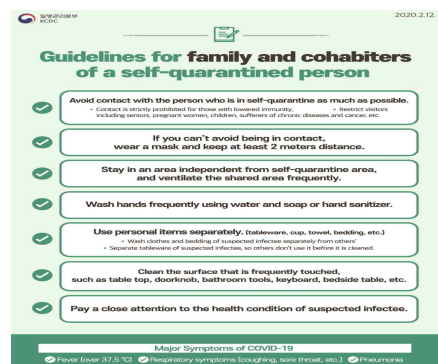
<28 February, Official Document for Demanding Staff Cooperation to prevent from further Infection>



<Every Team is Sharing Preventive Rules and Information in SNS>



<Self-Quarantine Rules>



<Self-Quarantine Rules for family>

## 6

## Station Closure & Non-stop Train Operations

Some stations are closed entirely and the trains slipped by during sterilizing operation.

DJET actively promoted disinfection and delivered situation report to the citizens.

For the safety of the citizens, the stations on the pathway of outbreak were closed, trains were passed without stop, and all those stations were sterilized entirely.

Non-stop of the trains and station closures were carried out immediately after the announcement of the confirmed cases from Health Authority. 23 trains passed the station without stop for an hour and 45 minutes from 16:15 to 18:00 on 26 February when the first case arised at Wolpyeong station. With the second additional case, 24 trains passed Dae-dong and Jungangno Station without stop for 2 hours from 13:00 to 15:00 on 28 February. And on the same day, a total of 16 trains passed non-stop for 1 and a quarter from 16:45 to 18:00 at Yuseong Spa Station.

In order to minimize the inconvenience to passengers due to the station closure and non-stop run, the announcements of station, trains, and the Total Control Room were conducted in the same way of an emergency. As a result, no complaint from passengers about the situation were received.

Meanwhile, as the Seo-gu health center completed disinfection of the entire station on the pathway, DJET also promoted it with banners, reassuring the citizens who are taking our urban railroads.



<14:00 Mayor's Briefing for COVID-19>



<16:00 Station Closure & Disinfection>



<16:00 Train Disinfection without Stop>



<16:00 Ticket machines Disinfection>



<A Notice for closing the Station>



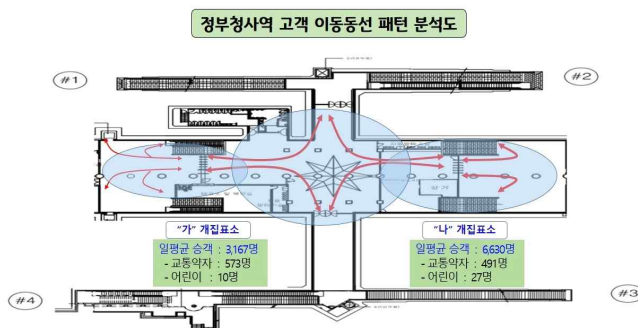
<18:00 A Banner says that Sterilization was Carried out>

## 7 Disinfection of Stations & Rolling Stocks

DJET Disaster Response Division led Company-wide support for onsite cleaning and disinfection, with sterilization for vulnerable areas detected through big data analysis.

To cope with the pandemic, DJET has operated the Disaster Response Division as its control tower, with the CEO who served as the Head. The Division actively established and implemented disinfection plans for stations and the rolling stocks.

DJET also utilized Big Data Analysis to prevent passenger infection. By following and analyzing the movements of people, the result showed that facilities such as escalators and ticket gates were found to be most vulnerable for infection.



<The Analysis of Customer Traffic Patterns  
(Government Complex Station)>

-> Contact Points : E/S, E/L, Ticket Machines, GateWays

DJET strengthened and actively conducted disinfection and sterilization with focus on common surfaces and spots, for instance, escalator handles, elevator buttons, and ticket machines.



<Intensive sterilization of Contact Points in the stations  
/ 5 times a day → all times>

As national disease crisis alert level was upgraded to "severe" by the government, all workers were further put in to strengthen disinfection and sterilization.

Partial sterilization was conducted 5 times a day at each station. And the number of entire disinfection expanded from 10 stations to all 22 stations in a day.



<Total Disinfection in Every Station Every Day>

In the early stage, 6 people from the head office assisted disinfection of rolling stocks at Panam station and its train depot. Later, it was altered to 10, with relocation to Banseok train depot, observing the rule of "perfect sterilization for every single operation." As it was carried out when the trains were reversed at the depot, it totalled to 121 times a day.



<Train sterilization of HQ Staff- Supporters  
/ 121 times a day>

Disinfection Labor Outsourcing Services for stations and rolling stocks increased from twice to four times a month through cooperation with Daejeon City.



## The Organization of DJET Disaster Response Division

### DJET preemptively established plans for the next step of the government's announcement of crisis alert level "Attention"

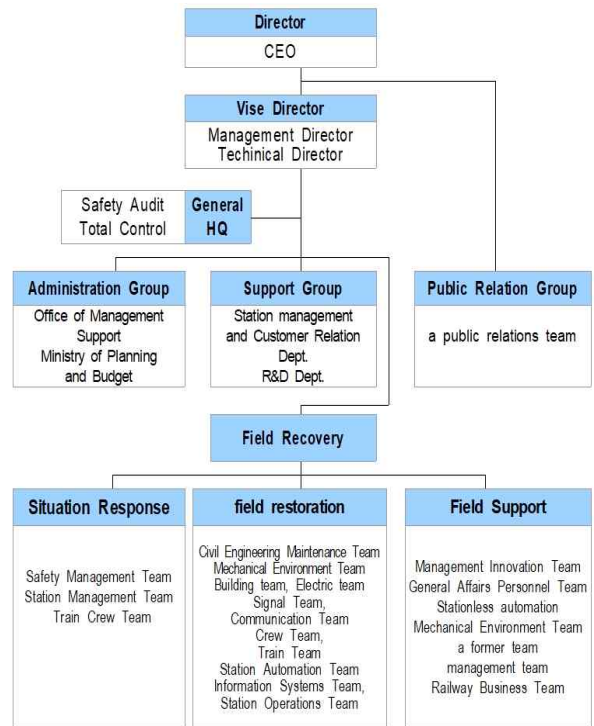
The government raised its infectious disease crisis alert level from "Attention" to "Caution" as the first domestic COVID-19 patient was reported on 01 January 2020 since the initial outbreak in Wuhan City, China, in late December 2019. The alert was adjusted to "Serious" level just a week later, as the fourth confirmed case was reported in South Korea on 27 January.

The first COVID-19 patient was reported in Daejeon on 21 February, while the first confirmed patient of DJET came out on 26. In the meantime, the government's crisis alert was upgraded to "Severe" level on 23 February.

DJET established action plans for COVID-19 prevention on 22 January, and also established and implemented prevention measures by operating the Disaster Countermeasure Team in line with the strengthened governmental plans of 5 February. Furthermore, DJET proactively devised the operation plan of Disaster Response Division for emergency response during the highest crisis level in advance. This made it possible to immediately respond to every situation, starting from 24 February during the time of "Severe" alert level.

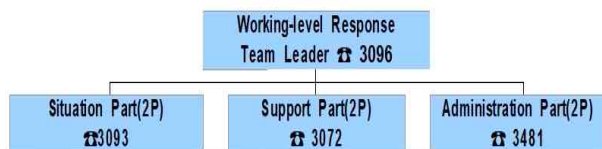
The Disaster Response Division served as a control tower to respond to COVID-19, with DJET CEO as head and managing and technical executives as vice directors.

<DJET DRD Command System>



While organizing the Disaster Response Division, the list of reinforcement staff was set up with discretion so that the company could flexibly respond during emergency without any labor shortages.

<DJET DRD Working Group>



\*the mode of work : Two shifts in two groups in different Working Time

The working group consisted of 3 groups with 2 double-shifts work system. Both regular and disaster management works were carried out.



## 9 Prevention Measures for Passenger Infection

### DJET strengthened prevention actions in stations and trains, eliminating the causes of infection between passengers.

Underground facilities used by 100,000 passengers per day are more vulnerable to infection than open spaces, due to high number of people in a confined space with limited ventilation.

Therefore, it is not possible to fully respond to the pandemic through ordinary cleaning, disinfection, and ventilation system.

Moreover, Daejeon citizens had anxiety about taking urban railroads because of the disclosed facts that one of the confirmed case took it and that a station staff was infected.

In order to relieve citizens' anxiety and respond more to COVID-19 infection, we enhanced damage prevention measures through stronger and more diverse activities than routine prevention measures.

First, thorough analysis about multiple contact points inside the stations and the trains, and meticulous cleansing and disinfection were carried out around the common points, focusing on rush hour.

To promote the self-sanitary management of citizen and staff, we placed 811 pumped hand sanitizers at congested places, and 50 at the drivers' cab of rolling stocks.

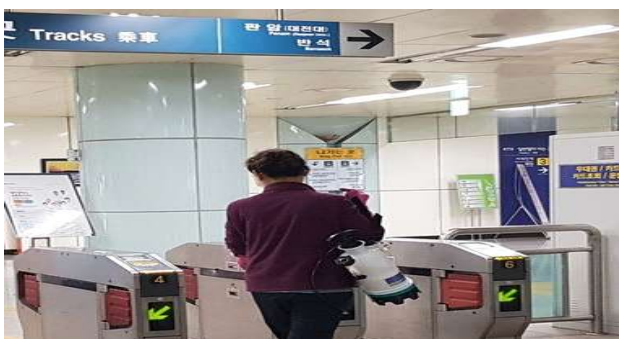


<Hand Sanitizers in the waiting room>

Customer service staff at stations were required to wear KF94 masks to avoid close contact with passengers. In addition, 12 non-contact thermometers were provided for temperature checks of both staff and passengers.



<Temperature Checks on Staff>



<Intensive Sterilization of the Contact points>



<Temperature Checks on Customers>

Furthermore, DJET halted the operation of all station facilities available for the convenience of passengers, such as book cafes, dance practicing halls, table tennis courts, citizens' meeting room like galmaul meeting center, youth rooms (supporting the youth community), and performance stages.



<All Facilities of the Stations Closed/ Dance Hall (Seodaejeon negeori Station)>

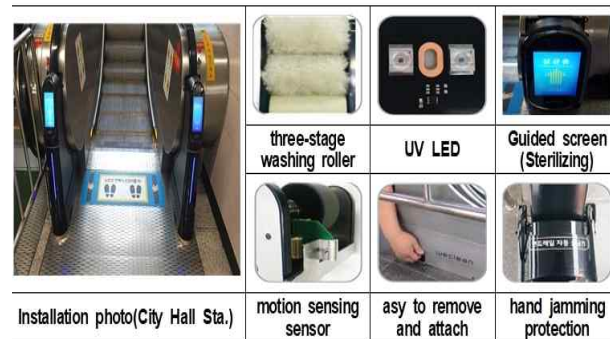
DJET also stopped all participatory activities of citizens, such as senior assistants and student volunteering to prevent safety accidents, and visiting programs to stations & train depots.

Token tickets used by passengers for the use of urban railroads were inspected and disinfected every day before the release.



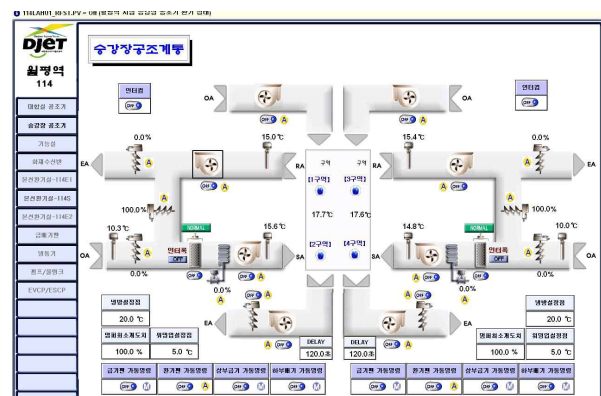
<Sanitizing Reusable Tokens>

For common contact points, we have reinforced disease response measures by adopting prevention and disinfection ideas of our employees. Attaching antibacterial film to elevator buttons and installing automatic disinfection equipment on escalator handles were the instances.



<Auto Sanitizers on Escalator(City Hall Station)>

Since COVID-19 infection is likely to be affected by droplets transmitted through ventilation, we changed the direction of air supply and exhaust of ventilation in the underground station.



<Air Supply and Exhaust Control in the Station>

The government disclosed the movements of the confirmed cases and operated designated clinics & “drive-through” clinics that mostly rely on voluntary reporting of people to assess how many individuals had symptoms. However, the need for further means to monitor the health status of asymptomatic persons arose.

Daejeon City then realized the demand for large-scale monitoring for random people.



Aligned with Daejeon City, DJET established and implemented thermal imaging camera operation plan to monitor the health status of many and unspecified individuals.

DJET installed 22 thermal imaging cameras to discover suspected cases with symptoms, limiting their use of urban railroads and guiding them to the designated hospitals promptly near the stations.



<Thermal Imaging Camera in front of Gateway>



<Building Cooperative Relationship with City Authority · Military · DJET>

Labor shortage and problems of excessive work generated from the thermal camera operations, which had to be on double shifts from dawn to evening, were solved through military support.

Those thermal imaging cameras were located in 18 stations, monitoring passengers for 16 hours a day, from 6:30 a.m. to 9:30 a.m.



<Thermal Imaging Camera Operation Base (City Hall Station)>

DJET directed checks on the health status of citizens by providing locations for camera installation, offering meals for military troops, and guiding people for medical clinics in the vicinity.



<Body Temperature Check with Personal information inquiry by the CDC>

In addition, through public activities, we actively promoted that the nation should be more actively prepared to respond to COVID-19 infection.



<Public Guide about COVID-19 on PSD>

**DJET offered masks to whole staff, placed hand sanitizers, and shared rules of personal hygiene for protection.**

As COVID-19 infection spread nationwide, DJET continuously shared “national behavior codes during ‘Severe’ crisis alert level, ‘personal hygiene rules for employees’, ‘guidelines to prevent and block diffusion of the pandemic’(7th edition), ‘guidance on disinfection of collective and multi-use facilities’(3rd edition), and ‘masks usage recommendations’ with citizens and employees.

Moreover, DJET thoroughly controlled access and management of the head office. All the staff who came to work were checked on body temperature and fever. The gymnasium inside the building was shut down and the connection passage with the rental side of the building in the head office was closed to block contact.



<Closing the Gym>



<Passage Blockade between HQ and the Side Block>

Stricter access control was conducted for any visitors other than DJET employees and all the entrances except the central one were closed.



<HQ Access Control>



<Body Temperature Check At the Gate>

The time of using the restaurant was allocated between each teams. Seating at the restaurant was limited to one line to avoid face-to-face interaction during meals.

For the suspected cases of the epidemic or the possible carriers, active self-quarantine and movement tracing were conducted to promptly exclude them from work. In the case of a station, those staff was replaced by people from the head office.



## 11 Business Management against Pandemic

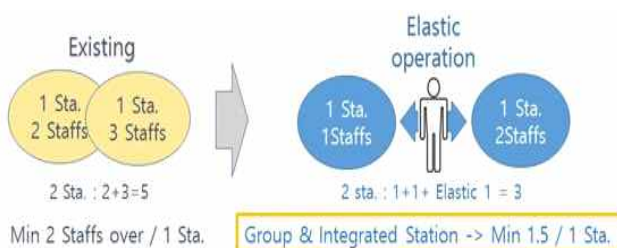
DJET implemented contingency plans to respond another crisis in the future that may be caused by the pandemic, minimizing the damage for the company itself.

DJET has established a special policy to protect passengers and staff from infection risks. The aim was to eliminate interruptions in operating urban railroads as a critical public transportation in Daejeon Metropolitan City that runs all year-round, and to prevent spread between passengers.

**Goal ① Minimizing labor shortage and the risk of head office closure in advance**

① Scale back the number of station staff to prepare for prolonged situation

In preparation for the prolonged infectious situation, a flexible and minimized labor plan was implemented by binding labor arrangement of station into groups.

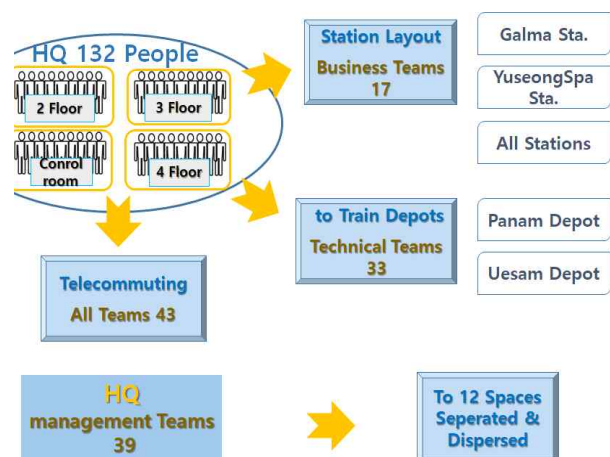


<Human Resource Operation in the Station>

In addition, we assigned the ordinary(daytime) staff as back ups to the stations, restraining demands for paper work so that they can focus on customer services.

② Office Reorganization ⇒ Separation and block of contact between the office workers and field teams

Although further spread of infection between DJET employees through contact with the first confirmed case was relatively prevented successfully, we should prepare for extreme situations such as shut down of facilities and business interruptions due to influx of COVID-19 from outside, as this pandemic could possibly spread much more widely to the local community. In order to do so, the executives including CEO, the Management Director, and the Technical Director were relocated in remote distance, and the headquarter workers' offices were also distributed to depots and stations.



<Department Separation Strategy of HQ>

Additionally, DJET simplified the human traffic lines of the entrance and connecting passages by blocking, and divided the 3 head office building zones to separate 12 sections for each floor of each zone.

The outside visitors' access of the cafeteria was controlled, and each team was allocated specific time to avoid the place being congested. The table chairs were arranged in one row as well. DJET Disaster Response Division and the Controlling Team used lunch box to block contact with outside.



<Distant Seats in the HQ Cafeteria>

Work Place	Department	Lunch Time
HQ 2F Control room	Management, Planning Dept.	11:20 AM
HQ 4F	Marketing Dept.	11:30 AM
HQ 1F, 3F	Technical Dept.	11:40 AM
Occupancy Agency	ETC.	12:00 PM

<The Lunch Timetable of HQ Staff>

- ③ **Staggered office hours and home working were adopted, with Division of teams into small groups.**

DJET re-established operation and maintenance plans with distributed workforce, and calls, e-mail, and SNS group chat were used for work discussion instead of face-to-face conferences. In case of shift workers, transfer of shifts were conducted through calls or in a distance as face-to-face contact could be frequent between their shifts. Non-urgent contacts were forbidden and staggered office hours were obligatory.

No.	Self-Quarantine Rules	Details (a method of action)
1	submit a security memo.	No internal data leakage through web or e-mail
2	No Outings and Travel	Prevention of Accidents due to Out of Work Place
3	Write a workbook	Submit Documentary evidence
4	Securing a contact network	Get in touch with HQ(DRD)
5	To change the working system	Get approval from the department manager.

<Self-Quarantine Rules for the staff / 2 March>



<Distributed Layout by Teams / R&D Center>

- ④ **Executive meetings were downsized, video conferences were introduced.**

DJET minimized face-to-face meetings among teams by securing unproblematic communication system between the distributed executives and enforcing expanded use of video conferencing facilities.



<Video Conferences of Executive meetings / 4 March>

- ⑤ **External access was controlled**

Separation of traffic lines between DJET staff, workers from tenant institutions, and external visitors was implemented, and the simultaneous use

## Goal ② Preventing train drivers' infection, to keep continuous operation without interruption even in an emergency

### ① Personal prevention measures were required.

Recognizing the fact that the COVID-19 infection of the drivers would be very critical, the personal health care measures and the testing procedure for infection were concisely and systematically performed.

Before boarding the rolling stocks to drive, they were checked on body temperature by thermal imaging cameras.



<Drivers' Body Checks with a Thermal Imaging Camera>

The drivers' cab was secured as a clean area as possible, with disposable masks and individual hand sanitizers furnished.



<Sanitizing the Train Driver's Cab>

Drivers were refrained from participating in group events, for instance, own team meetings and other group meetings. Also, sleeping gear were replaced and disinfected for shift workers.



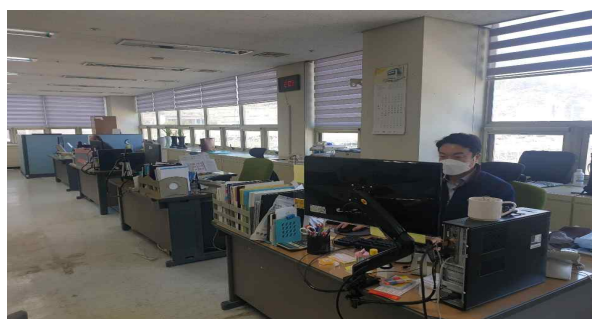
<Cleaning the Drivers' Sleeping Rooms>

By establishing preventive actions on drivers infection, DJET minimized the traffic lines between them through partially revised operating plan of trains and altered places of work start up and wrap up, which would make it harder to contact each other unconsciously.

Also, the infection was prevented by minimizing the number of contact between the rest of crew team and the drivers, who are office workers.

Contact time		Weekday (27)	Holyday (23)	note
Con tact	existing	270	230	10/Human
	improve	162	138	6/Human
Reduction		▽108	▽92	▽4times
Contact Ratio		▽60%	▽60%	▽60%

<Contact times of Drivers / 1 day >



<Distributed Layout of the Crew Office>



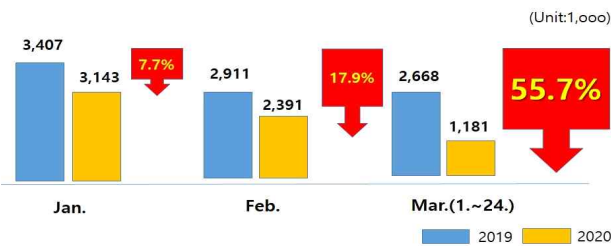




## 12 Passenger Declines and the Countermeasures

**COVID-19 brought dramatic fall in passenger numbers with its high infectivity, which is bigger than that of MERS**

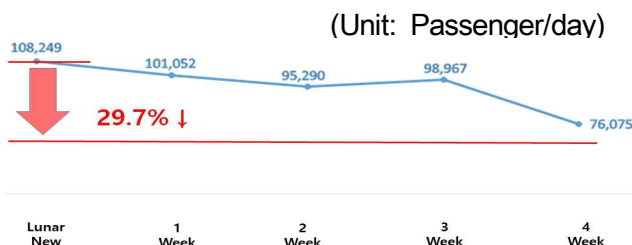
Because of the pandemic, 2,272,000 passengers decreased cumulatively from 1 January ~ to 24 March, which means a quarter dropped compared to the same time last year.



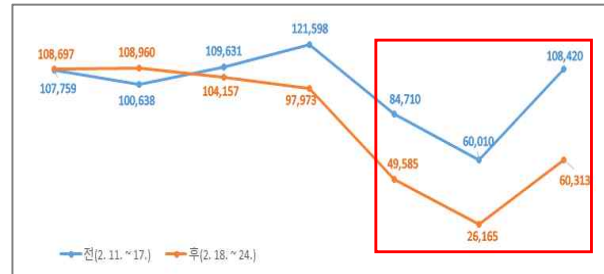
<Monthly Passengers Trends / Jan~Mar>

Looking at the number of passengers on a monthly basis compared to the previous year, the decrease of 7.7% in January, 17.9% in February, and 55.7% in March could be recognized, and it means the decline is getting larger.

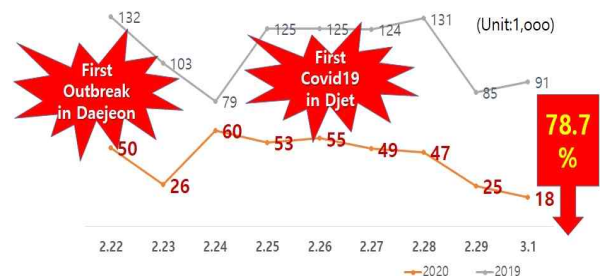
The decline rate of passengers has been lowered to 8.4% since the new year's day on 27 January, and then reached 19.8% in just a week since 18 February with the mass outbreak in Daegu City. Passengers decreased by 46.3% in just 3 days including 22 February when the first confirmed case was reported in Daejeon, and its next day when the Government upgraded national disease crisis alert to "Severe" level. The average number of passengers in a month decreased by 29.7% after New Year's Day in January.



<Daily Passengers Comparison of 2019 & 2020 Around 25 January (The Lunar New Year)>



<Daily Passengers Comparison of 2019 & 2020 Around 18 February(Massive Infection Outbreak in Daegu)>



<Daily Passengers Comparison of 2019 & 2020 Around 22 February(The First COVID-19 Infection in Daejeon)>

On 1 March, the lowest number of passengers in 2020 was recorded with only 18,017 passengers. This is equivalent to only 21.3% of the 66,504 passengers recorded on the same day of the previous year. This low number of passengers reflects people's anxiety about taking public transportation during the pandemic.

Due to the decrease in number of passengers, cumulative transportation revenues also decreased by 1.6 billion won from the previous year, and DJET should prepare a way to secure operating costs against deteriorating operating balances as the decrease is expected to further expand in the future.

## 13 Lessons that DJET Learned

In the story of Admiral Yi Sun-sin, there are words that he told his son Yi Hoe before defeating 330 large troops with just 12 ships in the Myeongryang Sea Battle even without the famous turtle ship.

“If you could turn your fear into courage, that courage would be enlarged by a hundredfold, a thousandfold.”

The COVID-19 has closed the world's borders, paralyzed economies, education, and sports, and caused the unprecedented situation of city blockades. The infection is indeed becoming a “horror pandemic” around the world.

DJET did not expect that the COVID-19 infection crisis would come to us this quickly, and at the beginning of it, the fear of group infection brought us a more pessimistic outlook.

Nevertheless, DJET is overcoming this desperately dangerous situation well with our staff, and we have the courage to constantly deal with it well in the future.

The power to change our fear of the pandemic into courage is initially generated from the cooperation of the central government, Daejeon Metropolitan government, and its citizens.

It was supported by new IT technology and rapid screening system of ICT that were used to quickly and transparently define movements of the confirmed cases based on reliability.

Moreover, this conversion of fear to the courage became the driving force that helped avoiding public transportation stoppages, blockades of cities, and shut-down of city functions, which is happening in Europe now.

In addition, experiences in overcoming MERS and SARS in the past became the lever to once again overcome the more fatal COVID-19 infection crisis with fortitude.

On 26 February, when the DJET staff first tested positive, the whole company was afraid of the coming situation.

However, DJET promptly identified the contacted employees and carried out work exclusions decisively. And from the night of 28 February to the weekends of 01 March, the company-wide reorganization of remote working and separation of duties was conducted in perfect order, that every ordinary tasks and business were carried out as always, without any interruptions in management.

This report is about the critical situation that DJET faced, with 95 staff being excluded from work because of the epidemic. We wrote it in hopes that other related organizations of urban railroads could cope with the pandemic well by changing fear into courage, referring to our experience.

## Reference

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[DJET. Daejeon Metropolitan Express Transit Corporation]

## COVID-19! We can overcome Together!



<DJET & the Union raised funds to donate to “Community Chest of Korea” to overcome COVID-19>



## About Daejeon City

Daejeon is South Korea's fifth-largest metropolis, with a population of over 1.5 million. Located in the central region of South Korea, Daejeon serves as a hub of transportation and is at the crossroads of major transport routes. The capital Seoul is about 50 minutes away by KTX high-speed train.

Daejeon is one of South Korea's administration hubs with the Daejeon Government Complex (Other administrative hubs: Seoul, Gwacheon and Sejong). Currently, 12 national government offices.

Daejeon has 18 universities, including KAIST and Chungnam National University. Daejeon has earned its name as "Asia's Silicon Valley" and "high technology city". The city hosted the Daejeon Expo '93 and the International Math Olympiads in 2000. Several important R&D Institutes are based in the city.

Daedeok Innopolis (Daedeok Research and Development Special Zone) is composed of 28 government-funded research institutions, as well as 79 private research institutes with as many as 20,000 researchers.



<wikipedia>

## About DJET

Daejeon Metropolitan Express Transit(DJET) was established in January 2005. Its purpose is to develop urban transportation and increase the convenience of the citizens.

The total distance of DJET Line #1 is 20.5km, connecting 22 stations.

On 16 March in 2006, It opened the first 10.8km of this line that runs 12 stations from Panam to Government Complex. Following that, on 17 April in 2007, opened the second section of 9.7km that includes the rest 10 stations from Government Complex to Banseok.

"Line #2" will have construction begin "soon" according to the statements from the Daejeon Metropolitan Government. The new "Line #2" will be a Tram. DJET participates in constructing Tram line and prepares for the future of Public Transportation.



# Fighting Against COVID-19

## Brief Countermeasures Report of Daejeon Metropolitan Express Transit Corp.(DJET)

25. March 2020

(To be updated)

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