KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

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Aircraft Serious Incident Investigation Report

PT Garuda Indonesia

Boeing 737-800; PK-GMP

Kualanamu International Airport, Deli Serdang

Republic of Indonesia

16 October 2024

2026

This Final Report is published by the *Komite Nasional Keselamatan Transportasi* (KNKT), located on the 3rd floor of the Transportation Building, Jalan Medan Merdeka Timur No. 5, Jakarta 10110, Indonesia.

The report is the result of an investigation conducted by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Act (UU No. 1/2009), and Government Regulation (PP No. 62/2013).

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Jakarta, 23 January 2026
KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AM	:	Aerodrome Manual
AOC	:	Air Operator Certificate
ATT	:	Aircraft Towing Tractor
AVI	:	Angkasa Pura Aviasi
BTT	:	Baggage Towing Tractor
CCTV	:	Closed-Circuit Television
DG	:	Director General
DGCA	:	Directorate General of Civil Aviation
ESA	:	Equipment Staging Area
FDR	:	Flight Data Recorder
GOM	:	Ground Operation Manual
GSE	:	Ground Support Equipment
ICAO	:	International Civil Aviation Organization
KNKT	:	Komite Nasional Keselamatan Transportasi/National Transportation Safety Committee
LST	:	Lavatory Service Truck
LT	:	Local Time
PBS	:	Passengers Boarding Stairs
PMI	:	Preventive Maintenance Inspection
S/B	:	Serviceable
SOP	:	Standard Operation Procedure
SSA	:	Station Safety Audit
U/S	:	Unserviceable
UTC	:	Universal Time Coordinated

SYNOPSIS

On 16 October 2024, a Boeing 737-800 aircraft registered PK-GMP was operated on a scheduled passenger flight from Soekarno-Hatta International Airport (WIII), Jakarta, to Kualanamu International Airport (WIMM), Medan. On board the aircraft were two pilots, five flight attendants, and 102 passengers.

At 1210 UTC (1910 LT), during nighttime, the aircraft departed Jakarta, and the flight was uneventful until landing at Kualanamu. At 2113 LT, the aircraft landed on Runway 23 and taxied to Parking Stand W29 via Taxiways G, A, A2, and U.

At 2126 LT, the aircraft was taxiing on Apron W and turned right to Parking Stand W29, following the lead-in line. At this time, the Flight Data Recorder (FDR) recorded that the aircraft's ground speed was approximately 5 knots, and engine N1 was about 21%.

At 2126 LT, the airport CCTV recorded that when the aircraft was in line with the parking stand, a Lavatory Service Truck (LST) which was parked in the Equipment Staging Area (ESA) began moving unaided. When the aircraft reached the parking position and stopped, the LST impacted the tail section of the aircraft. No persons were injured as a result of this occurrence; however, the aircraft and the LST were damaged.

The investigation did not find any record or report of any aircraft system malfunction and determined that the aircraft's serviceability was not an issue in this occurrence. Therefore, the analysis discusses the relevant issues of unintentional movement of the LST, awareness of the Ground Service Equipment (GSE) operator, and serviceability of the LST.

The KNKT concluded the contributing factors as follows:

- The assumption that an the unserviceable parking brake could be replaced with a wheel chock resulted in the LST with an unserviceable parking brake being assessed as a serviceable vehicle during periodic inspection and daily checks.
- The combination of late-evening work and developing fatigue might have influenced the improper placement of the wheel chock.
- The vibration from the LST engine running and the aircraft movement toward the parking stand, combined with the suction effect generated by the aircraft engine, might have triggered the movement of the LST.
- The existing triggering conditions to move the LST, combined with the downslope of the parking surface, the unserviceable parking brake, and improper placement of the wheel chock, resulted in the unintentional movement of the LST.

At the time of issuing this investigation report, the KNKT had been informed of the safety action taken by the ground handling service provider resulting from this occurrence and considered that the safety action was relevant to improving safety. However, there were still safety issues that needed to be considered, and the KNKT issued several safety recommendations to the ground handling service provider, airport operator, aircraft operator, and civil aviation authority.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 16 October 2024, a Boeing 737-800 aircraft registered PK-GMP was operated on a scheduled passenger flight from Soekarno-Hatta International Airport (WIII), Jakarta[1], to Kualanamu International Airport (WIMM), Medan[2]. On board the aircraft were two pilots, five flight attendants, and 102 passengers.

At 1210 UTC (1910 LT)[3], during nighttime, the aircraft departed Jakarta, and the flight was uneventful until landing at Kualanamu.

At 2113 LT, the aircraft landed on Runway 23 and taxied to Parking Stand W29 via Taxiways G, A, A2, and U (see Figure 8 in Subchapter 1.4).

A Ground Support Equipment (GSE) operator (Operator 1) drove the Lavatory Service Truck (LST) from Parking Stand W26 and parked it in the Equipment Staging Area (ESA)[4] between Parking Stands W28 and W29, facing northeast.

The GSE Operator 1 parked the LST with the engine running and the transmission in the neutral position. He decided to keep the engine running, as he had previously experienced difficulties starting it. The GSE Operator 1 recalled that the parking brake was set and that the wheel chock was placed on the right aft tire.

At 2124 LT, after the LST was parked, the GSE Operator 1 left the LST= cabin and walked to the right aft tire to place the wheel chock. He then closed the right cabin door and walked toward Parking Stand W30 to operate the Aircraft Towing Tractor (ATT) for another aircraft scheduled to depart. Based on airport Closed-Circuit Television (CCTV) footage, no other person was recorded entering the LST cabin or removing the wheel chock after the GSE Operator 1 left the LST until it impacted the aircraft.

Figure 1: The CCTV records when GSE Operator 1 placed the wheel chock (zoomed, cropped, and annotated by KNKT)

[1] Soekarno-Hatta International Airport (WIII), Jakarta will be named as Jakarta for the purpose of this report.
[2] Kualanamu International Airport (WIMM), Medan will be named as Kualanamu for the purpose of this report.
[3] The 24-hours clock in Local Time (LT) is used in this report to describe the time as specific events occurred. The local time at Kualanamu is Universal Time Coordinated (UTC) +7.
[4] The Equipment Staging Area (ESA) is designated area in the apron used for the temporary placement of ground support equipment and vehicles prior to servicing the arrival or departure of an aircraft

At 2126 LT, the aircraft was taxiing on Apron W and turned right to Parking Stand W29, following the lead-in line. At this time, the Flight Data Recorder (FDR) recorded that the aircraft's ground speed was approximately 5 knots, and engine N1[5] was about 21%.

Another GSE operator (GSE Operator 2) and maintenance personnel were on standby at Parking Stand W29 (see Figure 10 in Subchapter 1.6). The GSE Operator 2 was ready to place the wheel chock on the nose wheel after the aircraft had stopped and to operate the lavatory service system in the LST.

At 2126 LT, the airport CCTV recorded that when the aircraft was aligned with the parking stand, the LST began moving unaided. When the aircraft reached the parking position and stopped, the LST impacted the tail section of the aircraft.

Figure 2: The recorded CCTV showed the movement of the LST (zoomed and cropped by KNKT)

Figure 3: The LST impacted the tail section of the aircraft

At 2127 LT, the aircraft engines were shut down. Thereafter, the maintenance personnel informed the pilot that the aircraft had collided with the LST. The passengers then disembarked from the aircraft.

No persons were injured as a result of this occurrence; however, the aircraft and the LST were damaged.

[5] Engine N1 refers to the rotational speed of the low-speed spool which consists of the fan, the low-pressure compressor and the low-pressure turbine, all of which are connected by a concentric shaft.

1.2 Personnel Information

The GSE Operator 1 is a 30-years-old Indonesian citizen with 12 years of experience as a GSE Operator. He held a valid airside driving permit and competency certificate to operate several GSE, except the lavatory service system. The GSE Operator 1 had driven and parked the LST, including placing wheel chocks several times before the occurrence.

The GSE Operator 2 is a 29-year-old Indonesian citizen with 10 years of experience as a GSE Operator. He held a valid airside driving permit and competency certificate to operate several GSE, including the lavatory service system.

On the day of the occurrence, the GSE Operator 1 and GSE Operator 2 were working the afternoon shift from 1500 LT to 2300 LT. Since the beginning of the working shift, they had been handling seven aircraft.

1.3 Aircraft and Vehicle Information

1.3.1 Aircraft

A Boeing 737-800 aircraft registered PK-GMP had a valid Certificate of Airworthiness and Certificate of Registration. There was no report of an aircraft system malfunction during the occurrence.

The Boeing 737-800 Aircraft Maintenance Manual (AMM) Chapter 71 described the inlet hazard area for the engine at idle power condition as being within a 10-foot (3.1 meters) radius for the one engine (see Figure 4). Within this radius, the engine is capable of pulling a person or materials into the engine. When two engines are operated, the dangerous area is the combined left and right dangerous areas.

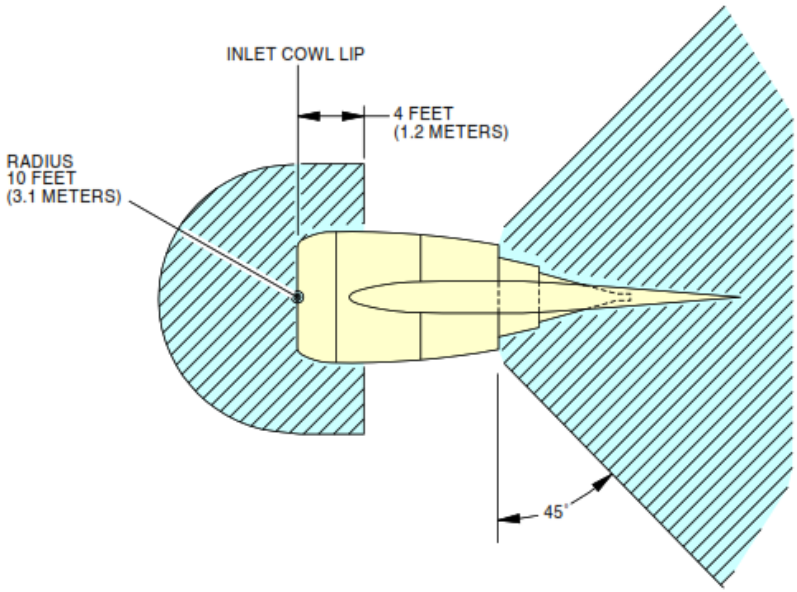


Figure 4: Illustration of inlet hazard area (indicated by the stripe area)

1.3.2 Lavatory Service Truck

The lavatory service system was originally installed in a truck manufactured by Mitsubishi in 1986 and had subsequently been reconditioned. The investigation could not find documentation related to the reconditioning process and could not identify the details of the technical specification of the truck.

The truck's parking brake system is controlled from the cabin by a ratchet-bar handle connected via a cable to the brake drum. The brake drum is installed on the propeller shaft, which connects the transmission gearbox and rear gearbox to the aft wheel. The following picture describes the typical mechanism and schematic control of the parking brake installed in the truck.

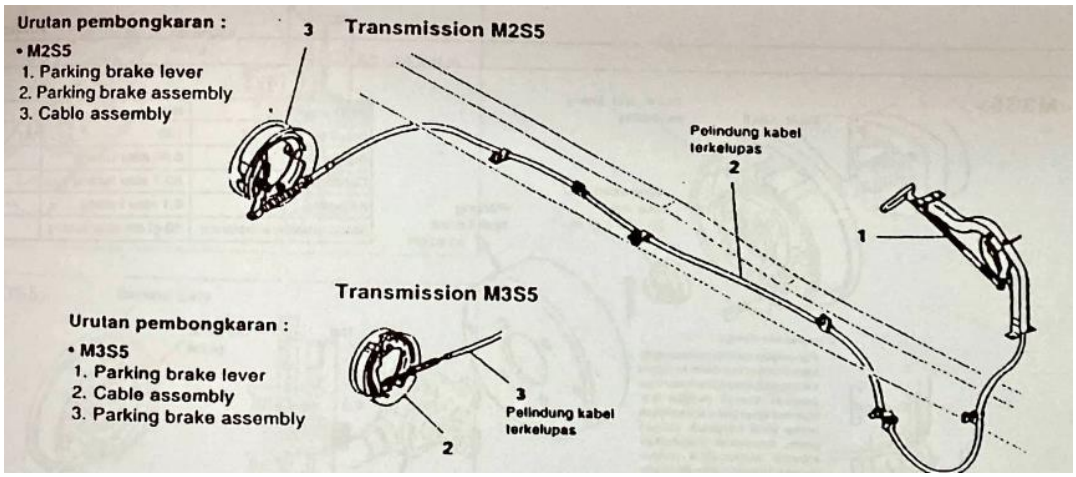


Figure 5: Typical mechanism and schematic control of the parking brake installed in the LST

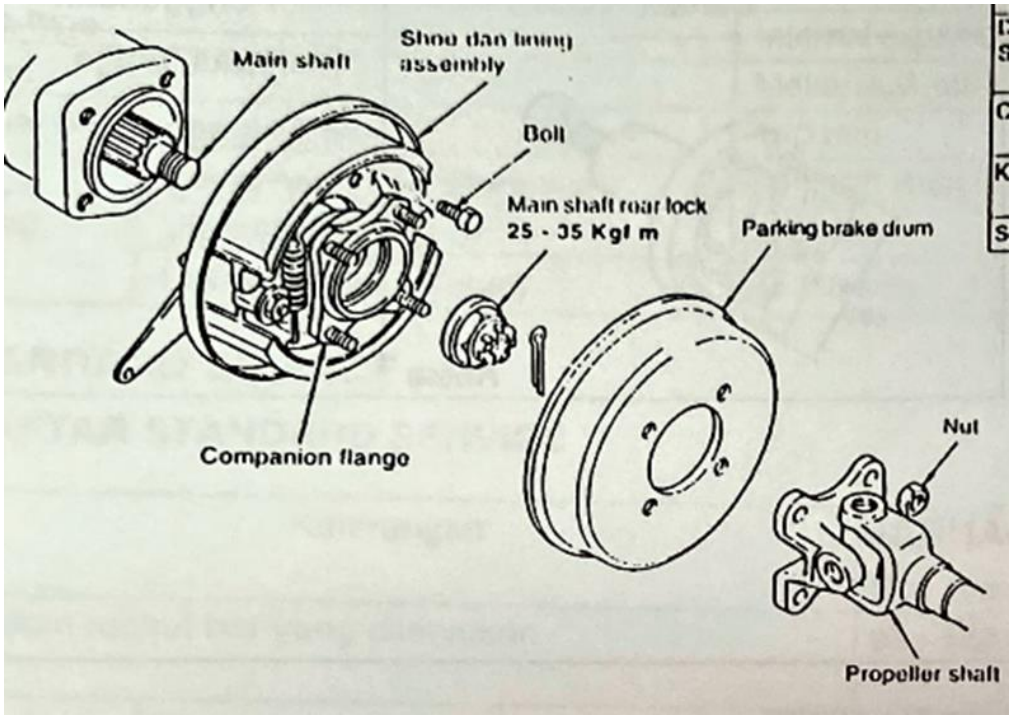


Figure 6: Components of the parking brake drum

The LST was equipped with a two-triangle wheel chock chained to the aft right wheel fender (see Figure 7). The dimensions of the triangles are shown in the following figure.

Figure 7: The dimension wheel chock of the LST (left figure) and the chained position of the wheel chock (right figure)

1.4 Aerodrome Information

Kualanamu International Airport is managed by PT. Angkasa Pura Aviasi, which holds a valid aerodrome certificate. The airport has a runway with directions of 05-23, and three main aprons (Apron V, Apron W, and Apron Y) with 32 parking stands. Parking Stand W29 is located on Apron W. The airport layout and the typical taxi routing for landings on Runway 23 are shown in the following figure.

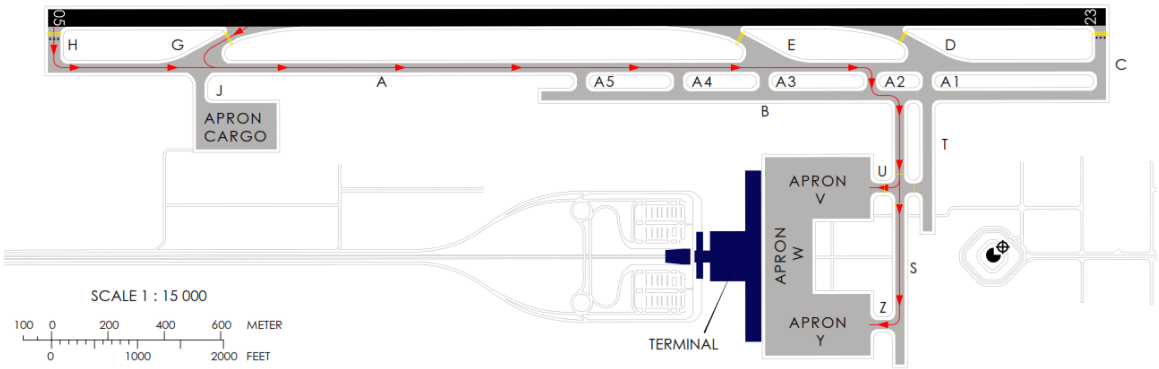


Figure 8: Taxi routing for landing runway 23

1.5 Flight Recorders

The aircraft was equipped with a Cockpit Voice Recorder (CVR) and a Flight Data Recorder (FDR). The recorded audio on the CVR had been overwritten. The aircraft movement, based on the FDR data, is shown in the following figure.

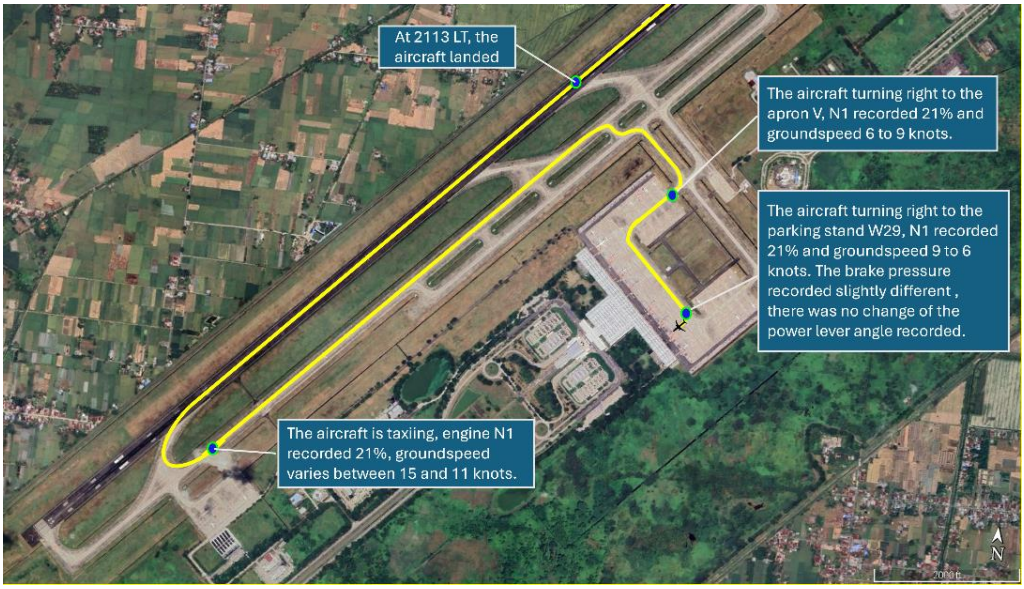


Figure 9: The aircraft movement based on FDR (superimposed with Google Earth by KNKT)

1.6 Wreckage and Impact Information

The LST impacted the tail section of the aircraft and resulted in damage to the aircraft. The documentation of the LST cabin after the occurrence indicated that the parking brake handle was not set.

The slope between the parking position and the impact point was measured by comparing height differences using a theodolite. The measured surface was a 0.57% downslope.

Based on CCTV footage and FDR data, the LST started to move when the aircraft was taxiing, along the lead-in line toward Parking Stand W29, at a distance of about 46 meters away.

Figure 10: The illustration of the occurrence site

1.7 Test and Research

The investigation examined the parking brake system. When the brake handle was pulled, it could be extended approximately 16.5 cm from its full forward position, and the ratcheting mechanism could be locked at any position. When the handle was pulled and pushed, the cable connecting the handle to the brake drum was able to move without any obstruction.

While the parking brake was pulled to its full position, the truck was pushed and moved freely. The brake drum was disassembled, and it revealed that the brake shoe, linings, and other components were not installed in the drum brake.

Figure 11: The parking brake drum without internal components

1.8 Organizational and Management Information

1.8.1 Aircraft Operator

The aircraft was operated by PT Garuda Indonesia, which held a valid Air Operator Certificate (AOC) number 121-001.

Garuda Indonesia conducts periodic Station Safety Audit (SSA) to identify operational safety hazards, including audits conducted on PT Gapura Angkasa.

The SSA conducted in May 2023 at PT Gapura Angkasa identified a Baggage Towing Tractor (BTT) being operated with an unserviceable parking brake. Following this audit finding, the BTT was removed from operation and transferred to the workshop. Thereafter, the finding was considered closed.

The most recent SSA conducted on PT Gapura Angkasa was performed in April 2024. One of the audit findings was that the parking brakes of the GSE Passenger Boarding Stairs (PBS) and BTT were not set while providing service to the aircraft. Following the audit finding, a briefing for the GSE operators was performed to emphasize the use of the parking brake and wheel chock while providing service and when parked near the aircraft. The finding was considered closed.

1.8.2 Airport Operator

Kualanamu International Airport (WIMM), Medan, is operated by PT Angkasa Pura Aviasi (AVI), which held a valid aerodrome certificate to operate airport services. The airport operator has developed the Aerodrome Manual (AM) and several procedures that contain policy, guidance, and airport operation-related procedures.

AM Subchapter 4.2.2 states that the Airside Operation Officer is responsible for supervising GSE movement. The procedure for conducting the supervision is described in the Airside Operation Standard Operating Procedure (SOP). Chapter XXIII of the SOP specifies that the supervision of the GSE is conducted by monitoring the CCTV in the operational room and by patrolling the airside. The SOP requires the Airside Operation Officer to check the availability of the hand brake, parking brake, and wheel chock. All supervision results must be reported to the supervisor and documented in the daily logbook.

The available checklist used by the Airside Operation Officer to conduct GSE supervision did not contain action items to check the availability of the hand brake, parking brake, and wheel chock. The investigation did not find any findings related to unserviceable GSE parking brake in the daily logbook from the time the parking brake was removed until the occurrence.

1.8.3 Ground Handling Service Provider

The ground handling services for the PT Garuda Indonesia fleet in Kualanamu are provided by the PT Gapura Angkasa.

PT Gapura Angkasa has developed the Ground Operation Manual (GOM) as guidance for operational service, and the GSE Maintenance and Technical Support Manual, which outlines the procedures, guidelines, and technical requirements necessary to ensure the safe, efficient, and compliant operation of all GSE used in airport ground handling services.

1.8.3.1 GSE Operational Procedures

Ground Operation Manual (GOM) Subchapter 6.1.2 describes the general requirements for the operation of GSE, including:

- The GSE shall be operated by personnel who hold a valid GSE operator competency certificate.
- The GSE operator shall check the parking brake during the daily check using the Daily Check Sheet. The GSE operator must assess all items in the Daily Check Sheet and determine the final status of the vehicle as serviceable (S/B) or unserviceable (U/S). If the parking brake is found to be inoperative, the GSE shall be prohibited from use and labeled as unserviceable.
- Motorized GSE with the engine running may be left unattended only in extremely cold weather conditions, if the parking brake is set and the wheel chock is placed. When the wheel chock is used, it shall be positioned properly.

The investigation did not find any means available to verify the proper placement of the wheel chock other than the procedure mentioned in GOM Subchapter 6.1.2.

1.8.3.2 GSE Maintenance Inspection and Check

The GSE Maintenance and Technical Support Manual Subchapter 1.6 defines serviceable as a condition or status of the equipment/vehicle in which all safety devices are complete and functioning, or in which the equipment/vehicle has only minor damage that does not compromise flight safety and security.

Based on the GSE Maintenance and Technical Support Manual, Preventive Maintenance Inspection (PMI) shall be conducted every 450 hours. The inspection checklist for the PMI includes the parking brake as part of the braking system inspection.

Inspection items			Service Period & Instruction				REMARK
			A1-A8 Chk	B1-B2 Chk	C Chk	D Chk	
BRAKING SYSTEM	1	Braking effectiveness	Chk	Chk	Chk	Chk	
	2	Bolts, fittings and mountings	Chk	Chk	Chk	Chk	
	3	Brake hose	Chk	Chk	Chk	Chk [4]	
	4	Brake fluid	Chk	Chk	Chk	Chk [4]	
	5	Master and Wheel cylinder rubber kit/parts	-	-	-	Chk [4]	
	6	Parking brake	Chk	Chk	Chk	Chk	
	7	Wear of shoe sliding portion and lining	-	-	-	Chk [4]	

Figure 12: PMI inspection checklist for braking system

PT Gapura Angkasa has developed a Daily Check Sheet to be used by the GSE operator as a checklist while performing a daily check. The Daily Check Sheet requires the GSE operator to check and test the LST parking brake as part of the drive system check. The results of the parking brake check and test are documented in the same column as the service brake. After all checks have been completed, the GSE operator shall determine the final check status, whether it is serviceable (S/B) or unserviceable (U/S).

Gapura

DAILY CHECK SHEET

DOCUMENT NO. : F-OT-27.L
ISSUED DATE :
REV. NO/DATE : 3

tittle :
GSE : LST -
INVENTORY NUMBER : 057

NO	DESCRIPTION	ACTION	BULAN : 1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Hour Meter														
ENGINE	Oil Engine & leakage / Oli mesin & Kebocoran	Check														
	Radiator coolant level / Batas Air Radiator	Check														
LAVATORY SYSTEM	Lavatory hose & coupler / Selang Lavatory & Coupler	Check														
	Water supply hose & adaptor / Selang Air & adaptor	Check														
	Water pump / Pompa air	Check														
	L S. basket lift lowered	Check														
	Basket lift up/down	Check														
	Hydraulic System / Sistem Hidrolik	Check														
ELECTRICAL SYSTEM	All lamp / Lampu - Lampu	Check														
	Switches / Saklar	Check														
	Indicators / Lampu Indikator	Check														
	Battery condition / Kondisi Baterai	Check														
DRIVE SYSTEM	Steering function / Fungsi Setir	Check & test														
	Service & parking brake func. / Fungsi Rem & Rem tangan	Check & test														
	Clutch Function / Fungsi kopling	Check & test														
	Transmission & PTO Function / Fungsi Transmisi & PTO	Check & test														
	Rear RPM adjustment / Pengaturan RPM	Check & test														
	Wheels condition / Kondisi Ban	Check														
OTHER	Firex / Tanggal masa berlaku	Check														
	Emergency hand pump / Pompa tangan darurat	Check														
	Fuel quantity / Jumlah Bahan Bakar	Check														
	Cleanness / Kebersihan Kendaraan	Check														
Final check status [S/B or U/S]																
WEEK						WEEK I							WEEK II			
Check by																

REMARKS :

Figure 13: Daily Check Sheet of the LST (red annotation by KNKT)

1.8.3.3 Implementation of GSE Maintenance Inspection and Check

The maintenance report of the LST dated 13 September 2023 recorded that the parking brake shoe and lining of the LST were removed. The reason for the removal was

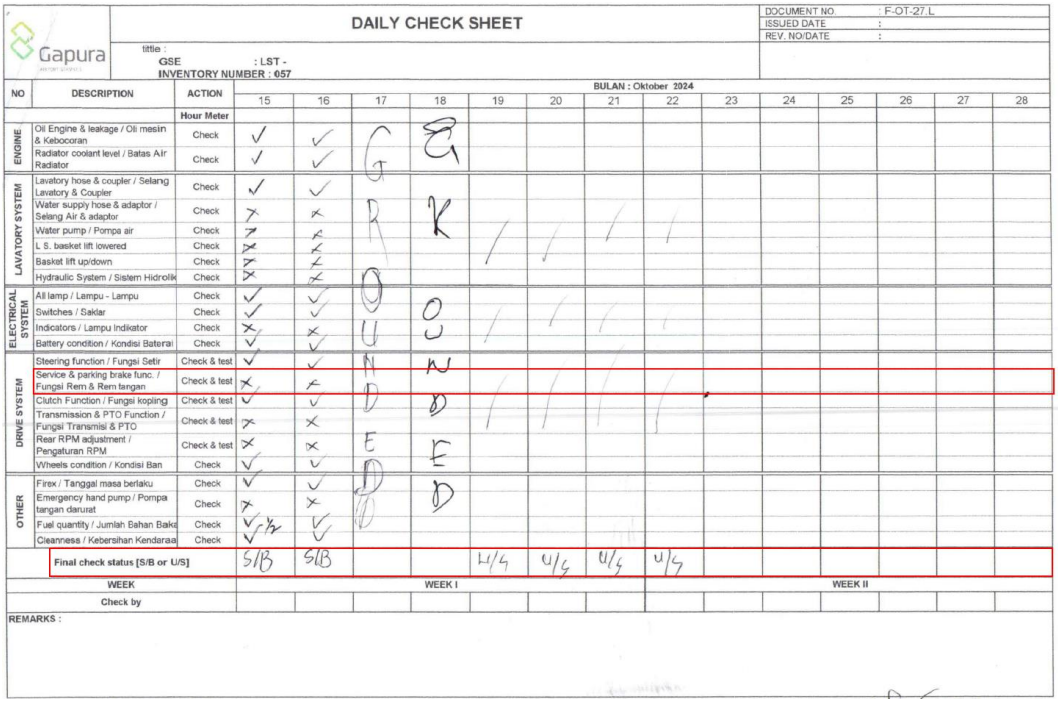
unknown. The replacement or reinstallation of the brake shoe and lining was not performed until the occurrence due to the unavailability of the replacement parts.

After the removal of the parking brake shoe and lining, PT Gapura Angkasa had conducted several PMIs. The result of the braking system checks of all PMIs showed that the parking brake was not marked as checked, and the braking system remark was filled as "OK".

The last three months of the Daily Check Sheet for the LST showed that the final status was filled with "S/B" (serviceable). The details of the Daily Check Sheet results are as follows:

- from 1 to 31 August 2024, the service and parking brake functions were filled with cross marks;
- from 1 to 14 September 2024, the service and parking brake functions were filled with check marks, also from 1 to 5 September 2024 an engine starter problem (battery low) was also recorded;
- from 15 to 31 September 2024, the service and parking brake functions were filled with cross marks, and there was a note that mentioned a parking brake problem;
- from 1 to 16 October 2024 (the day of the occurrence), the service and parking brake functions were filled with cross marks.

On the day of the occurrence, a GSE operator on the morning shift performed the daily check and found that the parking brake was unserviceable. The GSE operator marked the service brake and parking brake columns in the Daily Check Sheet as "X" (unserviceable). Considering that the unserviceable parking brake could be replaced with wheel chocks, the final check status of the vehicle on the Daily Check Sheet was marked as "S/B" (serviceable).



DAILY CHECK SHEET

DOCUMENT NO. : F-OT-27.L
ISSUED DATE :
REV. NO/DATE :

tittle : GSE : LST -
INVENTORY NUMBER : 057

BULAN : Oktober 2024

NO	DESCRIPTION	ACTION	15	16	17	18	19	20	21	22	23	24	25	26	27	28
		Hour Meter														
ENGINE	Oil Engine & leakage / Oli mesin & Kebocoran	Check	✓	✓	G	G										
	Radiator coolant level / Batas Air Radiator	Check	✓	✓												
LAVATORY SYSTEM	Lavatory hose & coupler / Selang Lavatory & Coupler	Check	✓	✓												
	Water supply hose & adaptor / Selang Air & adaptor	Check	✗	✗	R	K	/	/	/	/						
	Water pump / Pompa air	Check	✗	✗												
	L.S. basket lift lowered	Check	✗	✗												
	Basket lift up/down	Check	✗	✗												
	Hydraulic System / Sistem Hidrolik	Check	✗	✗												
ELECTRICAL SYSTEM	All lamp / Lampu - Lampu	Check	✓	✓	O											
	Switches / Saklar	Check	✓	✓		O										
	Indicators / Lampu Indikator	Check	✗	✗	U	U	/	/	/	/						
	Battery condition / Kondisi Baterai	Check	✓	✓												
DRIVE SYSTEM	Steering function / Fungsi Setir	Check & test	✓	✓	N	N										
	Service & parking brake func. / Fungsi Rem & Rem tangan	Check & test	✗	✗												
	Clutch Function / Fungsi kopling	Check & test	✓	✓	D	D	/	/	/	/						
	Transmission & PTO Function / Fungsi Transmisi & PTO	Check & test	✗	✗												
	Rear RPM adjustment / Pengaturan RPM	Check & test	✗	✗	E	E										
	Wheels condition / Kondisi Ban	Check	✓	✓												
OTHER	Firex / Tanggal masa berlaku	Check	✓	✓	D	D										
	Emergency hand pump / Pompa tangan darurat	Check	✗	✗												
	Fuel quantity / Jumlah Bahan Bakar	Check	✓	✓												
	Cleanness / Kebersihan Kendaraan	Check	✓	✓												
	Final check status [S/B or U/S]		S/B	S/B			U/S	U/S	U/S	U/S						
	WEEK					WEEK I							WEEK II			
	Check by															

REMARKS :

Figure 14: Daily Check Sheet of the LST in October 2024 (red annotation by KNKT)

1.8.3.4 Reconditioning

The GSE Maintenance & Technical Support Manual Subchapter 3.6 outlined the procedure for GSE reconditioning. The procedures require that several tasks be conducted and that formal documentation be completed during the process. The detailed procedure for reconditioning is provided in the appendix to this investigation report.

1.8.4 Civil Aviation Authority

The civil aviation operation in Indonesia is regulated by the Directorate General of Civil Aviation (DGCA) under the Ministry of Transportation. The DGCA has several regional offices, including the DGCA Region II Office, which is responsible for overseeing aviation activities at Kualanamu.

According to the Indonesian Law Number 1 of 2009 (Aviation Law), Article 219 requires airport operators to provide airport facilities that meet the requirements for flight safety and security. The airport facilities are required to be certified by the Minister of Transportation. The minimum requirements for airport facilities is stipulated in the Minister of Transportation Regulation Number PM 77 of 2015. The aforementioned regulation delegates the responsibility to conduct safety oversight of airport facilities to the DGCA. The regulation also states that motorized GSE, including the LST, are part of the airport facilities, and the details of their minimum requirements are described in the Director General of Civil Aviation (DG) Regulation.

DG Regulation number KP 635 of 2015 Article 2 states that the LST is included as a motorized GSE. The general requirements for motorized GSE as described in the regulation, include:

- the maximum age of the LST mentioned in that regulation is 15 years;
- having several safety features, including parking brakes to avoid vehicle movement during brake activation;
- having several safety devices, including parking brakes and/or wheel chocks that are capable of holding forward and backward movement at maximum load while stopped on a 4° (7%) slope.

In 2020, Article 219 of the Aviation Law was amended, and the provision for the Minister of Transportation to certify airport facilities was abolished. Following the amendment, the Minister of Transportation Regulation number *PM 77 of 2015* was repealed by Minister of Transportation Regulation number *PM 36 of 2021*. The new regulation excluded motorized GSE, including the LST, from airport facilities that need to be standardized. As a result of these changes, the DGCA no longer maintains a safety oversight program for the operation of motorized GSE.

1.9 Additional Information

Human Performance

The International Civil Aviation Organization (ICAO) Document 9966: Manual for the Oversight of Fatigue Management Approaches, Subchapter 1.1 defines fatigue as a state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, or workload. Fatigue can develop even during normal work hours, especially under operational and environmental demands. The

mental resources available to conduct a task may be reduced, and fatigue may begin to develop.

The ICAO Document 9966 Subchapter 2.3 describes the circadian phase, or circadian rhythm, as an innate cycle driven by the daily oscillation of the body's biological clock. The circadian rhythm prepares the body for rest by increasing melatonin secretion, starting at around 2100 LT, which helps regulate the sleep–wake cycle. Working during this period can lead to fatigue-related performance degradation, as natural alertness and attention decline, reducing overall vigilance. This may include slower cognitive processing, reduced attention to detail, and decreased task reliability. Such effects can occur even within standard duty-hour limits when tasks are prolonged or demanding (FAA, 2013) [6].

1.10 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the KNKT-approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

[6] Federal Aviation Administration. (2012). Fatigue risk management system for aviation maintenance: Human factors principles for maintenance organization (DOT/FAA/AM-12/13). Washington, DC: U.S. Department of Transportation.

2 ANALYSIS

After landing, there was no record or report of any aircraft system malfunction having occurred. The investigation determined that the aircraft's serviceability was not an issue in this occurrence. Therefore, the analysis addresses the relevant issues as follows:

- Unintentional movement of the Lavatory Service Truck (LST);
- Awareness of the GSE Operator; and
- Serviceability of the LST.

2.1 Unintentional Movement of the Lavatory Service Truck

The LST was parked at the Equipment Staging Area between Parking Stand W28 and W29 with the engine running. GSE Operator 1 recalled that the parking brake had been set, however, the documentation of the LST cabin after the occurrence indicated that the position of the parking brake handle was not set. The investigation found that the internal components of the parking brake drum, including brake linings and brake shoes, were not installed. Therefore, the parking brake would not have held the LST from moving, although the parking brake was set.

PT Gapura Angkasa Ground Operation Manual (GOM) Subchapter 6.1.2 allows motorized GSE to be left unattended with the engine running in extremely cold weather conditions, if the wheel chocks are placed properly. Such extremely cold conditions can make it difficult to restart motorized GSE, therefore, it is allowed to keep the engine running. The GSE Operator 1's decision not to shut down the engine was based on previous experience that the engine of the LST was difficult to start, as an engine starter problem (battery low) had been recorded.

Based on CCTV footage and FDR readouts, the LST started to move while the aircraft was taxiing, following the lead-in line toward Parking Stand W29 from a distance of about 46 meters away.

The FDR recorded that during turning until the impact, the N1 parameter of the aircraft engine was about 21% which indicates ground idle power. The Boeing 737-800 Aircraft Maintenance Manual states that the inlet hazard area of the aircraft, which can pull unwanted materials when the engine is at idle power, is 3.1 meters. Therefore, the distance between the right engine and the LST parking area when the LST started to move was not within the inlet hazard area.

The investigation could not identify the force that made the LST start to move. However, the vibration from the LST engine running and aircraft movement towards the parking stand, combined with the suction effect generated by the aircraft engine, might have triggered the movement of the LST.

CCTV footage showed that after leaving the cabin, the GSE Operator 1 placed the wheel chock and left the LST unattended. No other person was recorded in the CCTV entering the LST cabin or removing the wheel chock after the GSE Operator 1 left the LST. The triangle profile and dimension of the wheel chocks should be able to withstand the movement of the LST forward or backward direction. CCTV did not record any bumps at the initial movement of the LST that could indicate that the LST tire did not roll over the wheel chock. The absence of a bump on the initial movement indicated that the wheel chock was not properly placed on the LST's wheel.

The existing triggering conditions to move the LST, combined with the downslope of the parking surface, an unserviceable parking brake, and improper placement of the wheel chock, resulted in the unintentional movement of the LST.

While the LST was moving toward the aircraft, the GSE Operator 1 was unaware of the LST movement as he was operating the ATT for another aircraft departure at Parking Stand W30. Meanwhile, the GSE Operator 2 was on the ESA between Parking Stand W29 and W30, and the maintenance personnel were on standby at Parking Stand W29. Both were observing the aircraft and were unable to prevent the collision.

2.2 Awareness of the GSE Operator

The GOM Subchapter 6.1.2 requires GSE to be operated by personnel who have a GSE operator competency certificate. The GSE Operator 1, who drove and parked the LST, did not have a competency certificate to operate the lavatory service system, however he had a valid airside driving permit. The operation of the lavatory service system was to be performed by GSE Operator 2, who had a competency certificate for the lavatory system unit. The GSE Operator 1 had the knowledge to place wheel chocks properly and had the experience to park a motorized GSE, including placing wheel chocks several times. Placing wheel chocks was considered a routine task for GSE Operator 1 when parking the motorized GSE.

During the occurrence, the GSE Operator 1 had been performing duty for approximately six hours and thirty minutes in an eight-hour shift. During that period, the GSE Operator 1 had provided ground support for seven aircraft. After more than six continuous hours of work, especially under operational and environmental demands, the mental resources available to conduct a task may become reduced, and fatigue may begin to develop. Even mild fatigue can reduce vigilance and the thoroughness of routine checks, often without the individual being aware of it.

When GSE Operator 1 placed the wheel chock, he was simultaneously planning to operate another GSE, which required him to leave the LST to perform another task. The event occurred at around 2130 LT, when the circadian rhythm prepares the body for rest. Working during this period can lead to performance degradation, as natural alertness and attention decline, reducing overall vigilance.

The possibility of reduced mental resources available for each task made it more likely that certain actions, particularly routine or low-perceived-risk ones, were performed less thoroughly or without complete verification. Without any means to verify proper placement of the wheel chock, the developing fatigue and late-evening work might have influenced the improper placement of the wheel chock.

2.3 Serviceability of the Lavatory Service Truck

2.3.1 Periodic Inspection and Daily Check

According to the GSE Maintenance and Technical Support Manual, the LST must be checked periodically by the maintenance personnel in the workshop using the Periodic Maintenance Inspection (PMI) checklist. The parking brake is included as one of the inspection items in the brake system.

The maintenance report for the LST showed that on 13 September 2023, the parking brake shoe and lining of the LST were removed for an unknown reason. The removal of those components made the parking brake incapable of holding the LST in position. However, the availability of wheel chocks that can hold the LST in position made the LST considered serviceable. The replacement of the brake shoe and lining was not performed until the occurrence. After the removal, all PMI records showed that the parking brake was not marked as checked. The LST with an unserviceable parking brake was operated until the day of the occurrence.

Apart from the periodic inspections by maintenance personnel, the Ground Operation Manual (GOM) Subchapter 6.1.2 requires GSE operators to perform a daily check before operating the LST. The daily check included checking the parking brake using the Daily Check Sheet. The GSE operator shall assess all items on the Daily Check Sheet and determine the final status of the vehicle as serviceable (S/B) or unserviceable (U/S). If the parking brake is found to be inoperative, the GSE shall be prohibited from service and labeled as unserviceable.

On the day of the occurrence, a GSE operator on the morning shift performed the daily check and found that the parking brake was unserviceable. The GSE operator marked the service brake and parking brake columns in the Daily Check Sheet as "X" (unserviceable). Considering that the unserviceable parking brake could be replaced with wheel chocks, the final check status of the vehicle on the Daily Check Sheet was marked as "S/B" (serviceable).

The assumption that an unserviceable parking brake could be adequately replaced by wheel chocks resulted in the LST with an unserviceable parking brake being assessed as a serviceable vehicle during periodic inspection and daily check.

2.3.2 Oversight of Motorized GSE

The motorized GSE, including the LST, is included as an airport facility that must be certified by the Minister of Transportation to ensure the facilities meet the requirements for flight safety and security. The DGCA is delegated by the Minister of Transportation to conduct safety oversight of the motorized GSE operations. The Director General of Civil Aviation (DG) Regulation Number KP 635 of 2015 requires motorized GSE to have a functional parking brake as a safety feature of the vehicle. The regulation also requires motorized GSE to have safety devices, including a parking brake and/or wheel chocks that are capable of holding the vehicle from forward and backward movement at maximum load while stopped on a 4° (7%) slope. The requirement of safety devices as described in the DG Regulation Number KP 635 of 2015, which allows the replacement of the parking brake with wheel chocks, is contradictory with the requirement of safety features and might confuse the implementation of the regulation.

In 2020, the provision for the Minister of Transportation to certify the airport facilities was abolished, and the DGCA did not have a safety oversight program for the operation of motorized GSE. However, PT Gapura Angkasa (ground handling provider) still used the DG Regulation Number KP 635 of 2015 as a reference in their procedure manual. The contradictory requirements in the DG regulation have resulted in the assumption by PT Gapura Angkasa personnel that the unserviceable parking brake could be replaced with wheel chocks.

PT Garuda Indonesia (aircraft operator) conducted a Station Safety Audit (SSA) on their ground handling provider periodically. In May 2023, the SSA conducted on PT Gapura Angkasa identified the operation of the Baggage Towing Tractor (BTT) with an unserviceable parking brake. This finding was closed by placing the BTT in the workshop. Therefore, the reappearance of motorized GSE operated without a serviceable parking brake after closing the finding indicated that the corrective action did not systematically address the finding.

The next periodic SSA by the aircraft operator was conducted in April 2024, after the parking brake of the LST had been removed, and there was no finding related to the unserviceable parking brake of the LST. Considering that the BTT and LST were classified as motorized GSE, and the ground handling provider operated only one LST, this indicated that the SSA was ineffective in detecting the serviceability deficiencies of motorized GSE.

PT Angkasa Pura Aviasi (airport operator) also supervised the motorized GSE movement by performing airside patrol five times a day and monitoring the movements from CCTV in the operational room. The supervision procedure required checking the availability of parking brakes, and all the supervision results were documented in the daily logbook. However, the investigation did not find any findings related to the unserviceable GSE parking brake in the daily logbook from the time the parking brake had been removed until the occurrence. The absence of guidance or a checklist for conducting the parking brake check contributed to the lack of supervision of motorized GSE movement, which led to the unidentified motorized GSE operation with an unserviceable parking brake.

Without a safety oversight program from the DGCA, the ineffective audits from the aircraft operator, and the lack of supervision by the airport operator, the operation of motorized GSE with unserviceable parking brakes could not be prevented.

3 CONCLUSIONS

3.1 Findings

The findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

In this occurrence, the KNKT identified several findings as follows:

1. The aircraft had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). There was no report of any aircraft system malfunction during the occurrence.
2. The lavatory service system was originally installed in a truck manufactured by Mitsubishi in 1986. The truck was reconditioned, and the investigation could not identify the details of the technical specifications of the truck, as there was no formal document process found related to the vehicle reconditioning.
3. The GSE Maintenance & Technical Support Manual Subchapter 3.6 outlined the procedure for GSE reconditioning. The investigation could not find any documentation of the reconditioning process for the LST.
4. According to the GSE Maintenance and Technical Support Manual, the Lavatory Service Truck (LST) must be checked periodically by the maintenance personnel in the workshop using the Periodic Maintenance Inspection (PMI) checklist. The parking brake was included as one of the inspection items in the brake system.
5. The LST maintenance record dated 13 September 2023 showed that the parking brake shoe and lining of the LST were removed for an unknown reason. The replacement of the brake shoe and lining of the LST was not performed until the occurrence.
6. After the removal, all PMI records showed that the parking brake was not marked as checked. The LST with an unserviceable parking brake was operated until the day of the occurrence.
7. Apart from the periodic inspection by maintenance personnel, the Ground Operation Manual (GOM) Subchapter 6.1.2 required the GSE operator to perform a daily check prior to operating the LST. If the operator found that the parking brake was not working, the GSE was prohibited from being used and labelled as unserviceable.
8. The assumption of the unserviceable parking brake could be replaced with a wheel chock resulted in the LST with an unserviceable parking brake being assessed as a serviceable vehicle during periodic inspection and daily check.
9. The Ground Support Equipment (GSE) Operator 1 held a valid airside driving permit and did not have a competency certificate to operate the lavatory service system.

10. The PT Gapura Angkasa Ground Operation Manual (GOM) Subchapter 6.1.2 required GSE to be operated by personnel who have a GSE operator competency certificate.
11. The GSE Operator 1 drove and parked the LST facing in the opposite direction to the aircraft parking maneuver. The operation of the lavatory service was to be performed by the GSE Operator 2, who had a competency certificate for the lavatory service system.
12. The LST was parked with the engine running, and the GSE Operator 1 recalled that the parking brake was set. The investigation found that the internal components of the parking brake were not installed, which meant the parking brake would not hold the LST from moving, although the parking brake was set.
13. The extremely cold conditions may make the motorized GSE difficult to start, therefore, the GOM Subchapter 6.1.2 allowed motorized GSE to be left unattended with the engine running if the wheel chock was placed properly.
14. The GSE Operator 1's decision not to shut down the engine was based on previous experience that the engine of the LST was difficult to start, as an engine starter problem (battery low) was recorded.
15. After more than six continuous hours of work, especially under operational and environmental demands, the mental resources available to the GSE Operator 1 to conduct a task may be reduced and fatigue begins to develop.
16. The GSE Operator 1 had the knowledge to place a wheel chock properly and had the experience to park a motorized GSE, including placing a wheel chock several times. Placing a wheel chock was considered a routine task for GSE Operator 1 when operating a motorized GSE.
17. When GSE Operator 1 placed the wheel chock, he also planned to operate another GSE for another departure aircraft operation, which required him to leave the LST to perform another task.
18. The event occurred at around 2130 LT, when the circadian rhythm prepares the body for rest. Working during this period can lead to performance degradation, as natural alertness and attention decline, reducing overall vigilance.
19. There was a possibility of reduced mental resources available to the GSE Operator 1 for each task, making it more likely that certain actions, particularly routine or low perceived risk ones, would be performed less thoroughly or without complete verification.
20. Without any means to verify proper placement of the wheel chock, the developing fatigue and late-evening work might have influenced the improper placement of the wheel chock.
21. The motorized GSE, including the LST, was included as airport facilities that must be certified by the Minister of Transportation to ensure the facilities meet the requirements for flight safety and security.
22. The requirement for safety devices as described in the Director General of Civil Aviation (DG) Regulation number KP 635 of 2015 allowing a parking brake to be

replaced with wheel chocks, is contradictory to the requirement of safety features and might confuse the implementation of the regulation.

23. In 2020, the provision for the Minister of Transportation to certify the airport facilities was abolished, and the DGCA did not have a safety oversight program for the operation of motorized GSE. However, PT Gapura Angkasa (ground handling provider) still used the DG Regulation Number KP 635 of 2015 as a reference in their procedure manual.
24. The contradictory requirement in the DG regulation has resulted in the assumption of the PT Gapura Angkasa personnel that the unserviceable parking brake can be replaced with a wheel chock.
25. The Station Safety Audit (SSA) conducted by the aircraft operator to PT Gapura Angkasa in May 2023 identified the operation of a motorized GSE with an unserviceable parking brake. This finding was closed by placing the vehicle in the workshop.
26. About three months after closing the SSA finding in 2023, the operation of motorized GSE with an unserviceable parking brake reappeared, and it was not unidentified during the SSA in April 2024. This indicated that the corrective action did not systematically address the finding, and the SSA was ineffective in detecting the serviceability deficiencies of motorized GSE.
27. The airport operator had a supervision procedure to check the availability of the parking brake. However, the investigation did not find any findings related to the unserviceable of the GSE parking brake in the daily logbook from the time the parking brake had been removed until the occurrence.
28. The absence of guidance or a checklist provided by the airport operator to conduct a parking brake check contributed to the lack of supervision of motorized GSE movement, which led to the unidentified motorized GSE operation with an unserviceable parking brake.
29. Without a safety oversight program from the DGCA, the ineffective audit by the aircraft operator, and the lack of supervision by the airport operator, the operation of motorized GSE with an unserviceable parking brake could not be prevented.

3.2 Contributing Factors

Contributing factors are defined as actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided, or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident.

The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability. The presentation of the contributing factors is based on chronological order and does not show the degree of contribution.

The KNKT concluded the contributing factors as follows:

- The assumption that an the unserviceable parking brake could be replaced with a wheel chock resulted in the LST with an unserviceable parking brake being assessed as a serviceable vehicle during periodic inspection and daily checks.
- The combination of late-evening work and developing fatigue might have influenced the improper placement of the wheel chock.
- The vibration from the LST engine running and the aircraft movement toward the parking stand, combined with the suction effect generated by the aircraft engine, might have triggered the movement of the LST.
- The existing triggering conditions to move the LST, combined with the downslope of the parking surface, the unserviceable parking brake, and improper placement of the wheel chock, resulted in the unintentional movement of the LST.

4 SAFETY ACTION

At the time of issuing this draft Final Report, the KNKT had been informed of safety action taken by PT Gapura Angkasa resulting from this occurrence.

4.1 PT Gapura Angkasa

PT Gapura Angkasa amended the Daily Check Sheet by separating the check result columns for the parking brake and service brake.

4.2 PT Garuda Indonesia

1. PT. Garuda Indonesia issued a Notice to Auditor on 4 October 2024 highlighting the pre-audit reminder to the auditor before commencement of Station Safety Audit (SSA). One of the briefed items was to check the consistency implementation of GSE Maintenance Program.
2. PT. Garuda Indonesia performed a Special Audit at PT. Gapura Angkasa Station Kualanamu on 13-15 November 2024. During the audit it was found that the daily check records LST between May and October 2024 were not properly filled out and were not coordinated with the maintenance unit. The finding has been followed up by assigning a person to control the daily check form and coordinate with the maintenance unit.
3. PT Garuda Indonesia performed an audit at PT. Gapura Angkasa Head Office in 17 – 19 November 2025. During the audit, it was found that the Gapura Head Office did not implement and monitor the Preventive Maintenance Inspection (PMI) for GSE in the GSE Maintenance Database called AMTISS. The finding has been followed up by conducting weekly meeting with all stations, which discussed the subject of consistency on implementation PMI implementation.

5 SAFETY RECOMMENDATIONS

KNKT acknowledges the safety actions taken by PT Gapura Angkasa and considered that the safety action(s) was/were relevant to improve safety. However, there are still safety issues that need to be considered. Therefore, the KNKT issued safety recommendations to address safety issues identified in this report.

5.1 PT Gapura Angkasa

- **04-G-2024-22.01**

  The lavatory service system was originally installed in a truck manufactured by Mitsubishi in 1986 and was subsequently reconditioned. The investigation could not find any formal documentation for the reconditioning process as required in the GSE Maintenance & Technical Support Manual. The absence of formal documentation process resulted in the details of the technical specification and applicable maintenance manuals of the truck not being identified. This condition led to the serviceability of the GSE not being properly maintained.

  KNKT recommends that PT Gapura Angkasa ensure that the reconditioning of all GSE is implemented in accordance with the applicable procedures.

- **04-G-2024-22.02**

  PT Gapura Angkasa Ground Operation Manual (GOM) Subchapter 6.1.2 states that if the parking brake is not working, the GSE shall be prohibited from being used and labeled as unserviceable.

  The parking brake shoe and lining of the LST were removed during a Preventive Maintenance Inspection (PMI) on 13 September 2023. The removal of those components made the parking brake unable to hold the LST in position. However, the function of holding the LST from moving when it is parked was assumed to be replaceable by placing a wheel chock. The assumption that an unserviceable parking brake could be replaced with a wheel chock resulted in the LST with an unserviceable parking brake being assessed as a serviceable vehicle during periodic inspection and daily checks. The unserviceable parking brake contributed to the unintentional movement of the LST.

  Therefore, KNKT recommends that PT Gapura Angkasa to ensure the serviceability of the parking brake of the GSE to prevent the risk of collision.

- **04-G-2024-22.03**

  After more than six continuous hours of work in an eight-hour shift, especially under operational and environmental demands, the mental resources available to conduct a task may be reduced, and fatigue may begin to develop. Even mild fatigue can reduce vigilance and the thoroughness of routine checks, often without the individual being aware of it.

  When GSE Operator 1 placed the wheel chock, he also planned to operate another GSE, which required him to leave the LST to perform another task. The event occurred at around 2130 LT, when the circadian rhythm prepares the body for rest. Working during this period can lead to performance degradation, as natural alertness and attention decline, reducing overall vigilance.

The investigation did not find any means available to verify the proper placement of the wheel chock other than the procedure that requires the GSE operator to place the wheel chock properly. Without any means to verify proper placement of the wheel chock, the combination of developing fatigue and late-evening work might have influenced the improper placement of the wheel chock.

Therefore, KNKT recommends that PT Gapura Angkasa develop a mechnism to verify the proper placement of the wheel chock.

5.2 PT Angkasa Pura Aviasi

- **04-B-2024-22.04**

PT Angkasa Pura Aviasi (airport operator) also supervised the motorized GSE movements by performing airside patrol five times a day and monitoring the movements from CCTV in the operational room. The supervision procedure required checking the availability of parking brakes, and all the supervision results were documented in the daily logbook. However, the investigation did not find any findings related to unserviceable GSE parking brake in the daily logbook from the time the parking brake had been removed until the occurrence. The absence of guidance or a checklist for conducting parking brake checks contributed to the lack of supervision of motorized GSE movement, which led to the unidentified motorized GSE operations with an unserviceable parking brake.

Therefore, KNKT recommends that PT Angkasa Pura Aviasi to ensure the supervision of motorized GSE is able to detect the operation of GSE with an unserviceable parking brake.

5.3 PT Garuda Indonesia

- **04-O-2024-22.05**

PT Garuda Indonesia conducted a Station Safety Audit (SSA) of their ground handling provider periodically. In May 2023, the SSA conducted on PT Gapura Angkasa identified the operation of the Baggage Towing Tractor (BTT) with an unserviceable parking brake. This finding was closed by placing the BTT in the workshop. Therefore, the reappearance of motorized GSE operated without a serviceable parking brake after the closure of the finding indicated that the corrective action did not systematically address the finding.

The next periodic SSA by the aircraft operator was conducted in April 2024, after the parking brake of the LST had been removed, and there was no finding related to the unserviceable parking brake of the LST. Considering that the BTT and LST were included as motorized GSE, and that the ground handling provider operated only one LST, this indicated that the SSA was ineffective in detecting serviceability deficiencies of motorized GSE.

Therefore, KNKT recommends that Garuda Indonesia improve the Station Safety Audit to ensure that the operation of unserviceable motorized GSE can be prevented.

5.4 Directorate General of Civil Aviation

- **04-R-2024-22.06**

  The Director General of Civil Aviation (DG) Regulation Number KP 635 of 2015 requires motorized GSE to have a functional parking brake as a safety feature of the vehicle. The regulation also requires motorized GSE to have safety devices, including a parking brake and/or wheel chocks that are capable of holding the vehicle from forward and backward movement at maximum load while stopped on a 4° (7%) slope. The requirement of safety devices as described in the DG Regulation Number KP 635 of 2015 that allows the replacement of the parking brake with wheel chocks is contradictory to the requirement of safety features and might confuse the implementation of the regulation.

  Therefore, KNKT recommends that the DGCA review the Regulation Number KP 635 of 2015 to prevent confusion about the minimum requirements of the GSE.

- **04-R-2024-22.07**

  In 2020, the provision for the Minister of Transportation to certify the airport facilities was abolished, and the DGCA did not have a safety oversight program for the operation of motorized GSE. Without a safety oversight program from the DGCA, ineffective audits from the aircraft operator, and the lack of supervision by the airport operator, the operation of motorized GSE with an unserviceable parking brake could not be prevented.

  Therefore, KNKT recommends that the DGCA include the GSE operations in the safety oversight program.

6 APPENDICES

6.1 Procedures for GSE Reconditioning

GSE Maintenance & Technical Support Manual Subchapter 3.6 outlines the procedures for GSE reconditioning. The following procedures are written in Indonesia and translated into English for the purpose of the investigation.

The procedure for carrying out repairs classified as reconditioning for GSE production equipment is as follows:

a. *Each work unit must submit a reconditioning request based on operational needs to the Executive General Manager/General Manager.*
b. *The Executive General Manager/General Manager must submit the reconditioning proposal to the Director of GSE Maintenance & Technical Support at the Head Office for evaluation. The proposal must be in the form of a Reconditioning Evaluation Report (OT-29), which includes:*
    - *The unit's operational feasibility*
    - *The estimated reconditioning cost*
    - *The estimated economic value of the equipment post-reconditioning*
c. *If the proposal is approved, the GSE Maintenance & Technical Support unit at the Head Office will issue an approval letter for reconditioning. If necessary, the unit may conduct a technical evaluation before final approval by the relevant Director.*
d. *The reconditioning process can be carried out internally within the company or through third-party vendors.*
    1) *Internal reconditioning process:*
        - *The controller, maintenance support, or general manager issues a work order (WO).*
        - *The mechanic carries out the WO, prepares the required supporting documents, tools, and spare parts, and executes the repair.*
        - *Any replacement of parts must be accompanied by a material slip.*
        - *If the mechanic encounters issues during the reconditioning process, they must immediately report them to the controller, maintenance support, or general manager for resolution.*
        - *If the issue requires further expertise, it is escalated to the engineering team or the GSE maintenance & technical support unit at the Head Office.*
        - *If the unit is deemed unrepairable, it is recommended for asset write-off.*
        - *Human resources department is informed if the process involves personnel or administrative actions.*
        - *The controller, maintenance support, or general manager issues a re-work order (Re-WO) if further corrective actions are needed.*
    2) *Reconditioning through a third-party vendor:*
        - *After the appointment of the winning bidder for the reconditioning work, the Controller/Maintenance Support/General Manager must issue a Repair Order, which will be submitted to the executing party (third party).*
        - *If the reconditioning process requires outsourcing to a third party, the controller, maintenance support, or general manager must issue a repair order (RO) for external repair.*

- *The controller, maintenance support, or general manager must ensure that the third-party vendor carries out the reconditioning according to the agreed scope, timeline, and budget.*

e. *After reconditioning, the equipment must undergo a functional test by the QC, controller, or general manager to confirm that it meets operational standards.*

f. *QC, controller, or general manager will issue a serviceable tag if the reconditioned equipment is deemed operationally fit.*

g. *The following documents and forms may be used in the reconditioning process:*
   - *Work order*
   - *Repair order*
   - *Reconditioning evaluation report*
   - *Material slip*
   - *Illustrated parts catalog*
   - *Serviceable tag*
   - *Unserviceable tag*
   - *Maintenance log book*

Notes:

For spoke branches where the maintenance section has no designated personnel, maintenance responsibility and supervision are carried out directly by the controller or general manager.

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