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Evaluation of Buggy Car Service Arrangement for Passengers with Special Needs: A Case Study at Sultan Hasanuddin International Airport

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ABSTRACT

This study aims to evaluate the operational arrangement of buggy car services for passengers with special needs at Sultan Hasanuddin International Airport in Makassar. Using a qualitative descriptive approach and case study design, data were collected through field observation, interviews, and documentation during a five-month internship in the Airport Operation Landside and Terminal (AOLT) division. The findings indicate that the service implementation still faces several critical issues, such as limited vehicle availability, overcapacity usage, lack of standardized service points, misuse by non-priority passengers, and the absence of written Standard Operating Procedures (SOPs). These problems contribute to inefficiencies, safety risks, and unequal service for those entitled to priority treatment. The study recommends the formulation of structured SOPs, additional pick-up/drop-off points, regular training for AOLT personnel, and the adoption of digital support systems to enhance the effectiveness and fairness of buggy car services. By improving management policies and operational consistency, the service can better reflect the values of inclusive and human-centered airport operations, in line with Regulation of the Minister of Transportation No. 41 of 2023.

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INTRODUCTION

Sultan Hasanuddin International Airport-Makassar (IATA: UPG, ICAO: WAAA) is a vital infrastructure that plays an important role as the main gateway to support community mobility, economic growth, and tourism [1]. With its role as a public service provider and a major hub connecting Eastern Indonesia, Sultan Hasanuddin International Airport must prepare services that can be used by all types of passengers. This is reiterated by the International Civil Aviation Organization (ICAO), which states that all passengers are entitled to equal service, including passengers with special needs [2]. This group includes pregnant women, the elderly, people with disabilities, parents with infants, and children traveling without companions. The buggy car service at Delhi Airport is a free of cost facility to help passengers reach locations. Persons with limited mobility, senior citizens, pregnant women and women traveling with infants can avail this facility for a free and smooth travel experience. Both arriving and departing passengers (transit/transfer) can avail the buggy car service at the departure area (arrival) [3].

According to the Ministry of Transportation of the Republic of Indonesia Regulation No. 41 of 2023 on Airport Service Provision, the principles of airport service include safety, security, reliability, comfort, convenience, and equality [4]. As a form of fulfilling this principle, the provision of value-added services such as buggy cars is an important instrument to facilitate the mobility of priority passengers in a fair and structured manner. Although Sultan Hasanuddin Airport has met the technical criteria for the availability of buggy cars, its implementation in the field still faces various challenges [5]. Some of the main issues identified include a limited number of vehicles, passenger transportation that often exceeds capacity, unsafe route designs, and the absence of written Standard Operating Procedures (SOPs) to guide staff in providing services.

Figure 1 Use of buggy cars with a 2-seater configuration per row but used by 3 passengers per row and damage to the terminal floor surface due to overcapacity use of buggy cars.

The overloading of buggy cars also causes a new problem, namely damage to the terminal floor where the buggy cars pass. The damage caused by the weight of the buggy cars, which is disproportionate to the strength of the floor surface, could be prevented if there were clear Standard Operating Procedures (SOPs) in place, enabling staff to act wisely and firmly when providing services to priority passengers, thereby ensuring their comfort and safety.

Previous studies have highlighted the importance of providing transportation facilities to enhance accessibility at airports. For example, Gotti (2024) revealed inconsistencies in accessibility features for passengers at major airports, including variability in services for passengers with special needs [6]. Additionally, research from the Transportation Research Board emphasizes the need to reassess staff training and establish systematic operational procedures to support services for the elderly and people with disabilities [7]. This is to ensure that services are accessible to all passenger groups. However, there has been no specific research evaluating the operational procedures for buggy cars at airports.

Therefore, this study was conducted to analyze the operational arrangements for buggy car services for passengers with special needs at Sultan Hasanuddin International Airport in Makassar, focusing on identifying operational challenges, evaluating compliance with applicable regulations, and formulating recommendations for the development of Standard Operating Procedures (SOPs) as a

guideline for managing buggy car services in a more orderly, fair, and sustainable manner. This study aims to analyze operational barriers for buggy cars and the compliance of field conditions with Regulation PM 41 of 2023, thereby formulating recommendations for the development of written SOPs and training for staff to ensure that buggy car services become more orderly, fair, and sustainable.

Based on observations, there are various problems that affect the effectiveness of buggy car services for passengers with special needs at Sultan Hasanuddin International Airport-Makassar. These problems reflect the gap between normative provisions and operational practices in the field. Some of the main points that are highlighted are as follows:

1. The operation of buggy cars for passengers with special needs at Sultan Hasanuddin-Makassar International Airport is not optimal.
2. There is a gap between the Standard Operating Procedure (SOP) set and field practice.
3. Passengers with special needs have not fully received priority buggy car services consistently.
4. Operational officers do not fully understand or implement buggy car services.
5. The condition of the buggy car lane is damaged (fading, peeling, etc.) due to the application of vehicle operations that have not been fully optimized during operations.

In an attempt to gain a comprehensive understanding of the issues that arise in the management of buggy car services, this research focused on several main objectives designed to answer problems in the field, namely:

1. Analyzing the condition of buggy car facilities in the special departure terminal area for passengers with special needs.
2. Identifying barriers experienced by passengers with special needs in utilizing buggy car services.
3. Evaluate the implementation of the buggy car SOP and detect gaps between documents and practices in the field.
4. Provide recommendations for service improvements and the development of effective SOPs to improve accessibility and service quality.

METHODS

This study uses a descriptive qualitative approach with a case study design that aims to systematically and thoroughly describe the buggy car service arrangements for passengers with special needs at Sultan Hasanuddin International Airport in Makassar [8]. This approach was chosen because it is suitable for examining social phenomena in their natural and complex contexts, and allows researchers to gain a deep understanding of the dynamics in the field [9]. The case study in this context is aimed at understanding the management of buggy car services, which do not yet have standard procedures and still face various operational obstacles.

The object of this research is the buggy car service system, particularly those intended for priority passengers such as the elderly, pregnant women, people with disabilities, and parents with infants. This research was conducted in the departure terminal area of Sultan Hasanuddin International Airport-Makassar, specifically at the Airport Operation Landside and Terminal (AOLT) unit. Data collection was carried out during the On the Job Training (OJT) period, from October 2024 to February 2025.

Further details regarding the informants and the timing of the research can be summarized as follows:

1. Main informant: Mr. Alimudin Basri (Head of AOLT Sultan Hasanuddin Airport).
2. Additional informants: 1 shift supervisor, 1 buggy car operator, and 2 staff members from the Airport Service Improvement Department.
3. Observations were conducted over a 3-week On-the-Job Training (OJT) period in February 2025, with a frequency of 2 observation sessions per day (morning and afternoon) during peak hour flight times (5:00-7:00 a.m. WITA and 5:00-8:00 p.m. WITA).
4. Interviews were conducted both structured and unstructured with personnel representatives on a regular basis during each shift.

Data was obtained through three main techniques: field observation, semi-structured interviews, and documentation. Interviews were conducted with one key informant, Mr. Alimudin Basri, the Head

of the Airport Operation Landside and Terminal Department, who is considered to have knowledge and authority in managing buggy car operations at the airport. Observations were conducted directly on buggy car service activities, from passenger transportation, route conditions, to operational impacts such as potential damage to the terminal floor due to vehicle overload. This observation technique is important for observing natural processes without intervention and serves as a basis for validating other data [10].

Data analysis was conducted using qualitative thematic analysis, involving the examination of observation results, interviews, and documentation, which were then categorized into main themes such as: buggy car scheduling systems, operational routes, vehicle capacity, service load, and passenger priority determination mechanisms. The analysis was conducted inductively and narratively, following the stages of data reduction, data presentation, and conclusion drawing as suggested by Miles and Huberman [11]. Additionally, technique triangulation was performed to enhance the validity of the findings by comparing data from the three sources.

RESULT AND DISCUSSION

Buggy Car Conditions

Interviews with the Head of the AOLT Department, Mr. Alimudin, revealed that the buggy car service at the airport continues to face several operational challenges. These include limited passenger capacity management, the arrangement of mobilization flows, and the criteria for determining passengers who are eligible to use the service. In addition, the total availability of buggy cars is restricted to four units, which is often inadequate to meet passenger demand, particularly during peak hours.

To address this limitation, staff sometimes transport passengers in numbers exceeding the designated seating configuration, thereby causing the vehicle to become overcapacity. While such measures are intended to expedite service and reduce waiting times, they simultaneously raise safety concerns because they deviate from established operational standards. Overcapacity conditions can lead to reduced vehicle stability and increase the likelihood of safety risks. These observations are consistent with the study conducted by Fei and Pan, who reported that electric vehicles operating beyond their load capacity at airport aprons were prone to instability, which could heighten the risk of minor accidents and damage to terminal infrastructure [12].

Figure 2 Physical damage to the floor of the buggy car terminal caused by continuous overcapacity use of buggy cars.

Fei and Pan's study is consistent with the conditions observed in the use of buggy cars at Sultan Hasanuddin International Airport, Makassar, where the operation of these vehicles has resulted in damage to the terminal floor along several routes, manifesting as small cracks and dents. Beyond aesthetic concerns, such damage poses potential safety hazards for both passengers and airport personnel if left unaddressed. Furthermore, the utilization of buggy cars at this airport is often ineffective due to their frequent use by non-priority passengers. In certain cases, non-priority passengers insist on accessing the service even when units are not available at the designated pickup points, thereby reducing the availability of buggy cars for passengers with special needs. This misuse of services parallels issues identified in airport accessibility research, where facilities intended for Persons with Reduced Mobility (PRM) are occasionally exploited by individuals outside the target group. Hine and Mitchell, for

example, reported that approximately 6% of PRM-designated services in Europe were misused by non-eligible passengers, consequently undermining the effectiveness and intended purpose of such facilities [13].

User Barriers to Utilizing Buggy Car Services

1. Information about Buggy Car Services Inside the Terminal

   Observations show that upon entering the departure terminal, the presence of buggy cars is quite clear thanks to signs and parking areas at the front of the terminal. However, after entering the terminal area leading to the departure gate, further information about the location and availability of buggy cars is still minimal. There are no adequate directional signs, signage, or digital information in strategic areas within the building. As a result, passengers with special needs, such as the elderly, pregnant women, or parents with infants, often struggle to find the nearest buggy car service without having to return to the starting point. Additionally, there are no audio announcements or verbal information to help indicate the location of active buggy cars. This forces passengers to ask AVSEC officers or passing buggy car officers directly. Therefore, it is necessary to add visual and verbal information systems at several points in the terminal to make the service more accessible without confusion.

2. Long Waiting Times Due to Limited Buggy Car Parking Spaces

   Currently, buggy car operations at Sultan Hasanuddin Airport are supported by four vehicles. However, the main challenge is not the number of units but the limited parking space for buggy cars, which is only available at one main point in front of the departure terminal. This results in significant waiting times, especially when buggy cars are serving passengers inside the terminal. Although the management has coordinated between buggy car units and provided additional standby locations, the limited space in the front terminal area remains the primary obstacle to expanding parking points. This situation impacts service efficiency, especially during peak hours when demand for the service increases.

   This situation causes priority passengers to wait longer when demand for buggy cars is high, as available units are still en route or have not returned to the parking point. This often leads to queues, especially during busy departure times.

   As a solution, it could be considered to add temporary pickup and drop-off points in strategic areas within the terminal, or to provide dedicated temporary parking for buggy cars. This approach could reduce waiting times and make the service faster and more efficient.

Figure 3 Buggy Car Parking Area at the Beginning of the Departure Terminal Area, Which Can Only Accommodate One Buggy Car Unit

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Figure 4 Buggy Car Parking Area in the Departure Terminal Waiting Area that Can Accommodate Three Buggy Cars

3. Socialization of Priority Service Scheme for Passengers with Special Needs by AOLT Personnel

A significant obstacle arises from the lack of socialization to Airport Operation Landside and Terminal (AOLT) personnel regarding the priority scheme in buggy car services for passengers with special needs. Field observations indicate that many staff members do not clearly understand who should be prioritized for buggy car services. As a result, buggy cars are often provided first to general passengers who request them directly, while passengers with special needs are overlooked or forced to wait longer.

This situation reflects weaknesses in internal coordination and a lack of operational training for special assistance. Gotti's study emphasizes that staff competence in assisting passengers with disabilities is significantly influenced by the quality of training and consistency of procedures across various airport departments [6]. Without systematic and ongoing training and service guidelines, buggy car services will continue to operate without a structured priority scheme, leading to dissatisfaction and even unfairness for passengers entitled to priority services.

Therefore, regular socialization regarding buggy car priority SOPs, as well as formal and layered training for AOLT staff, is essential to ensure that buggy car services become fairer, more efficient, and aligned with the principles of special needs passenger services.

4. Consequences if SOPs are not enforced

If the Standard Operating Procedure (SOP) for buggy car services is not strengthened and implemented consistently, various risks and negative impacts may arise. Firstly, a decline in the quality of service for passengers with special needs is likely, as the lack of clear standards can create uncertainty and reduce user satisfaction-according to the finding that service quality, including staff reliability, is a key predictor of airport passenger satisfaction levels [14]. Secondly, in terms of safety, practices such as passenger overload and high-speed vehicle operations without SOPs increase the potential for accidents or incidents. Thirdly, terminal infrastructure, especially buggy car lanes and floors, are at risk of deteriorating faster due to non-design use, thus increasing maintenance costs [15]. Fourth, without written documentation and procedures, evaluation and monitoring of services is difficult as there are no valid performance indicators or record keeping, a common problem in poorly documented public services. Fifth, inter-personnel inconsistencies become evident when SOPs are not socialized evenly, leading to different interpretations by staff and service variations. Similar conditions have been linked to service anomalies at other airports, where service inconsistencies result in perceptions of unfairness. Finally, failure to comply with regulations such as Permenhub No. 41/2023 can lead to legal and administrative implications, including potential sanctions. Therefore, strengthening SOPs is not only an operational necessity, but also a strategy to maintain safety, efficiency, and a reputation as a fair and inclusive airport.

Implementation of Standard Operating Procedure (SOP) Recommendations

Based on field findings and analysis of the obstacles encountered in operating buggy cars at the departure terminal of Sultan Hasanuddin International Airport in Makassar, it can be concluded that the absence of written SOPs is one of the main factors causing the service to run in an unstructured manner. The absence of official guidelines has led to various deviations in the field, such as the use of buggy cars by non-priority passengers, overloading, and fluctuating service routes based on demand.

Therefore, the development of Standard Operating Procedures (SOPs) is essential to serve as a technical guideline for buggy car staff in providing services, while ensuring that operations align with principles of safety, comfort, and fairness. These SOPs are designed considering operational aspects on-site, applicable regulations, and the principle of providing excellent service to passengers with special needs.

Table 1. Recommended Standard Operating Procedures for Operating Buggy Cars

No	Activity Stages	Procedure Description	Person in Charge	Eligibility Standards	Special Note
1	Initial Physical Inspection of Vehicles	- Check the physical condition, tires, lights, horn, and seat belts. - Make sure the battery is sufficiently charged. - Check the brakes and steering. - Make sure there are no leaks or damage. - Document the results of the inspection.	AOLT Personnel / Technical Personnel	All components are functioning normally, with no damage or leaks.	Do not operate if there is any vital damage.
2	Document and Legality Check	- Ensure that drivers have valid licenses. - Ensure that vehicles have valid operating permits and that they are within their validity period. - -Check that vehicles are within the age limit specified	AOLT Personnel / Administrative Personnel	Complete and valid documents.	Vehicles that do not meet the maximum age requirement may not be operated.

		by regulations.			
3	Service Preparation	- Ensure that the vehicle is clean and tidy. - Prepare boarding/alighting aids (wheelchairs/walking sticks) if there are passengers with disabilities. - Prepare priority signs on the vehicle	AOLT Personnel	Cleanliness and readiness of aids.	Give priority to priority passengers.
4	Passenger Reception	- Verify passenger needs (pregnant women, elderly, disabled, children aged 5 to 12 traveling alone). - Provide assistance with boarding/disembarkin.	AOLT personnel	Priority passengers are served safely and comfortably.	Do not force passengers to board if they are unwilling.

		- Explain the route and estimated travel time. - Ensure passengers are seated safely and seat belts are fastened			
5	Vehicle Operation	- Drive the vehicle at a safe speed of 5-20 km/h. - Prioritize safety and comfort. - Stop at official service points. - Monitor passenger conditions during the trip	AOLT Personnel	Speed according to airport standards, no reckless driving	Do not carry passengers exceeding capacity (maximum 5-7 passengers)
6	Passenger Disembarkation and Drop-off	- Assist passengers in disembarking safely. - Ensure that no luggage is left behind. - Confirm that the	AOLT Personnel	Passengers disembark safely, luggage is complete.	For unaccompanied children, ensure that there is a pick-up officer from the airline personnel.

		destination is correct.			
7	Final Physical Inspection of Vehicle	- Re-check the condition of the vehicle after use. - Record any damage/incidents during operation. - Clean the vehicle. - Park in the designated area	AOLT Personnel/Technical Personnel	Vehicle is ready for next operation	Report any damage/incidents

Analysis of Observation Results based on Recommended SOPs

Table 2. Observation Results based on Recommended SOP

No	Procedural Stage	Reality of Implementation	Gap	Causes
1	Initial Physical Inspection of Vehicles	Performed haphazardly without formal recording	No written documentation of inspection results	Lack of written Standard Operating Procedures (SOPs)
2	Document and Legality Check	Only performed when a new vehicle enters monthly operations	No daily checks on driver legality and vehicle age	Lack of daily operational administration system
3	Service Preparation	Vehicle cleanliness is sometimes neglected tools are not always available	Service is not always consistent with equipment readiness standards	Lack of supervision and operational checklists
4	Passenger Reception	The priority scheme has not been optimally implemented, often	Passengers with special needs are often neglected	Personnel lack understanding of service priorities despite the

		based on order of arrival		availability of visual media
5	Vehicle Operation	Generally safe, but speed and capacity monitoring is not yet optimal	No speed and passenger number monitoring system in place	No real-time control system
6	Passenger Disembarkation and Drop-off	No service records or specific confirmations	Daily service data not documented	SOPs on reporting not available
7	Final Physical Inspection of Vehicle	Performed as needed without written reports	No final evaluation of vehicles after service	No daily recording or reporting system in place

Based on the results of research conducted through direct observation and interviews with the operational coordinator of buggy cars at Sultan Hasanuddin International Airport in Makassar, it can be concluded that the implementation of Standard Operating Procedures (SOP) for buggy car services at the airport is not yet fully in accordance with the provisions of Minister of Transportation Regulation No. PM 41 of 2023 and applicable internal service guidelines.

This finding indicates that while buggy car services are generally operational and meet passengers' basic needs, they do not yet fully meet the safety, comfort, and efficiency standards as stipulated in government regulations. Therefore, comprehensive improvements are needed in procedures, administrative systems, staff training, and supporting facilities to enhance the quality of buggy car services at Sultan Hasanuddin International Airport in Makassar.

Buggy Car Service Management Solution

Referring to various obstacles encountered in managing buggy car services at Sultan Hasanuddin International Airport, such as the lack of written SOPs, limited parking and service points, and irregular priority schemes, it is necessary to refer to other airports that have implemented similar systems more optimally.

One solution that can be applied is the use of digital SOPs and a buggy car service reservation system based on an application, as implemented at Changi International Airport in Singapore and also discussed by Gotti. This system-based service allows priority passengers to access services more quickly and efficiently, as staff can immediately identify requests and respond by assigning available units [6].

Additionally, in a study by Fei and Pan, it was noted that strategically placing service points at key locations, such as near check-in counters, elevators, and boarding gates, significantly reduces buggy car service waiting times. This approach directly addresses field findings at Sultan Hasanuddin Airport, where buggy car parking points are currently only available at one main location, thereby slowing service rotation during peak hours [12].

Another highly relevant solution is the implementation of regular training and a service evaluation system based on user feedback. Ancell's study shows that structured training for field staff can improve understanding of the priority scheme and make the service more humane and professional. This is particularly relevant to the conditions on the ground, where many AOLT staff still do not fully understand who is entitled to priority service [16].

Reccomendations

Table 3. Reccomendations

Priority	Recommended Solution	Execution Time
Short Term	Re-socialization of SOPs for buggy car personnel to minimize operational errors, addition of buggy cars during peak hours to reduce waiting times.	4 times in 3 months
Medium Term	Implementation of a digital buggy car call system or airport app for queue management. Implementation of a digital buggy car call system or airport app for queue management.	1 time in 3 months
Long Term	Rejuvenation of the buggy car fleet to more environmentally friendly vehicles with the latest technology. Full integration of buggy car services into the computerized airport management system.	1 time in 6 months

CONCLUSION

Based on the results of research on the provision of buggy car services for passengers with special needs at Sultan Hasanuddin International Airport in Makassar, it can be concluded that the implementation of this service still faces various operational obstacles, particularly due to the lack of written Standard Operating Procedures (SOPs) to guide staff. Other issues contributing to the poor quality of service include: insufficient communication of the priority scheme to field personnel, a lack of service points or buggy car parking areas leading to queues, and misuse of the service by non-priority passengers.

However, the buggy car service plays a crucial role in realizing the principle of equal service at the airport, as mandated by Ministry of Transportation Regulation No. 41 of 2023. Without proper and professional management, this service risks causing unfairness and endangering the safety of both passengers and terminal infrastructure.

To improve the quality of buggy car services for passengers with special needs at Sultan Hasanuddin International Airport in Makassar, it is necessary to establish clear written Standard Operating Procedures (SOPs), conduct regular training for staff, add service points in strategic areas of the terminal, and utilize digital technology for more efficient and targeted service management. With comprehensive improvements in policy, infrastructure, and human resources, it is hoped that the buggy car service at Sultan Hasanuddin International Airport in Makassar can serve as a model for effective and sustainable inclusive service practices in the Indonesian aviation industry. .

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