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Parliamentary Committee Inquiry,

Personalised Transport

AMIND Pty Ltd, is a well established company which is the largest wheelchair conversion enterprise in Queensland. Established more than 17 years ago, our business has expanded to become a national leader in wheelchair accessible vehicles and maxi taxi conversions.

We understand there is a proposed change in existing legislation to allow wheelchair accessible taxis to operate without having to purchase a new vehicle every specific number of years. We respectfully request the Parliament to consider not introducing a proposal to remove the no-age limit on vehicles as it could jeopardise the safety of both the wheelchair passenger and the driver.

In the 17 years that we have operated, we have acquired sufficient knowledge and experience to instill the practice that lifters should be replaced over time, given the parts of the lifter are significantly utilised each day. The maxi taxi life on average is 8 years and we believe the lifter should be replaced also in line with that vehicle replacement timetable. We are concerned by the practice of a maxi taxi vehicle being changed over for a newer model and installed with the 8 year old (or older) lifter from the previous vehicle.

The first and foremost consideration that must be taken into account is the safety of the passengers and driver of an accessible wheelchair vehicle. When operators do not replace lifters, people who use this equipment daily can be jeopardised. We confidently put this viewpoint because when lifters age, wear out and tear, they can cause catastrophic outcomes.

Given the option of not replacing lifters, the lives of the people who use this equipment daily can be jeopardized. We confidently put out this statement because when lifters age, wear out and tear, they can cause road accidents.

In terms of cost efficiency, lifters need to be maintained to be able to perform at their best.

We urge you to seriously consider this matter as we know you take the safety of the aged and disability community in Queensland as a matter of priority.

Yours sincerely,

Amin Noroozi
Managing Director
AMIND PTY LTD

Lifter Maintenance – Steel Fatigue

SUBMISSION 2017

By Anton Foster

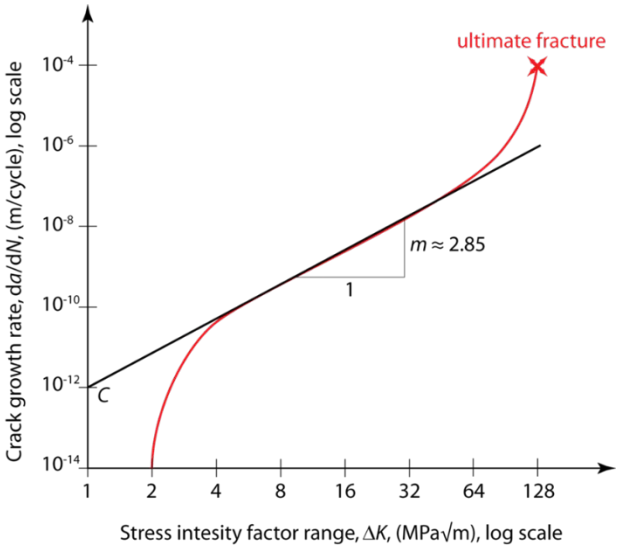
Business Development Manager – AMIND PTY LTD

AMIND has always believed in putting its customers first. Being one of Australia's leaders in the taxi conversion industry, AMIND has initiated many successful conversions which have inevitably helped the disabled community in transportation; the primary reason for a taxi lifter is to place a disabled person together with his or her wheelchair inside a taxi with ease and safety. Because the comfort and security of the people are at stake, AMIND focuses on the reliability, strength and toughness of its products including its lifters. The public who ride a taxi will generally assume that the taxi is capable of bringing in the wheelchair safely with care. However, they may be unaware that the condition of the lifters are crucial to transporting them safely to their destination. Material science tells us that fatigue is "the weakening of a material caused by repeatedly applied loads." Of course when a material comes under constant pressure and weight or repetitive loading and unloading, progressive damage is bound to occur. Should the loads fall above a certain threshold, cracks can start to form and as the cycle goes on, the cracks can only get bigger and once it hits the danger level, the material will fracture.

In line with material science, it is widely believed and accepted that lifters wear and tear over a period of time and should be replaced after a certain period. In one of the studies, steel is characterized like a paper clip that after numerous backward and forward bending, would just succumb to breakage due to the exceeding yield stress. According to this study, there is a certain number of cycles that can be endured by a metal before it shatters completely. The reiterative actions of a taxi lifter that is not being maintained and checked for considerable repairs may lead to breakdown of the lifter and can pose serious danger and even lead to terrible accidents. The load that the lifters carries also plays a significant effect on the yield stress level of the metal. The heavier the load placed on the lifter and as the cycles continue to be stressed upon it, eminent danger lurks and it is just a matter of time before the lifter snaps. No one would want to be present at the point of the metal's endurance snapping when a passenger is being lifted simultaneously as a horrible accident will take place. Without a doubt, preventive security measures are essential to the safety of the users; it is important that the lifters be constantly checked and maintained through minor repairs and even be replaced if needed.

In an example to demonstrate and emphasize the pivotal measure of continually maintaining the lifter, AMIND has used the figures below to help highlight the point. Let's take Taxi A from company ABC for an example. Taxi A transports an average of 10 wheelchair passengers a day. This would mean a 20 times stress on the lifter a day because 10 is for loading at the initial destination and another 10 is for unloading at the desired destination. At the rate of 20 cyclic loading and unloading a day for 365 days, a year would reach the minimal figure of 7300 of loading and unloading on each and every wheelchair

lifters in the taxis. If each lifter is used for 8 years, 7300 x 8, would bring the total stress to a sizeable figure of 58400. This can cause microscopic cracks on the lifter which are often invisible to the human eye. In a worse scenario, the lifter can snap without warning and this is only at a minimal level of usage per day. A majority of the times we are looking at a much higher number than just 10 trips per day for each wheelchair taxis. If the number even doubled, the stress of the loading and unloading placed on the lifter can be too much, inevitably giving way that will cause serious accidents. Aligning with these figures, it is extremely crucial that lifters be maintained or replaced by the taxi companies should the need arise.



According to the image on the left, as the stress intensity applied upon the material increases, so does the crack growth rate. There is a gradual increase in crack growth from between 4 to 50 MPa√m of stress intensity but after around 50 MPa√m, the crack growth steeped to the ultimate fracture. The danger in taking a risk on lifters, is that no one can accurately predict the crack growth rate of the lifter and neither can anyone predict when it will snap.

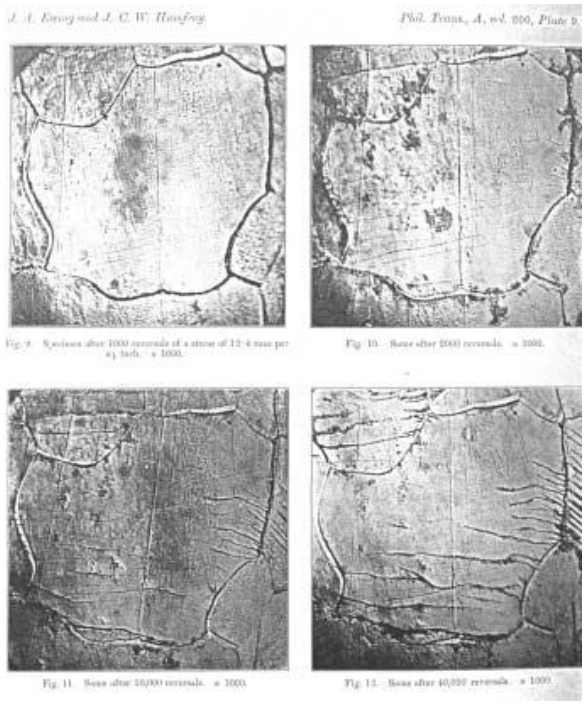
In cases where the drivers refuse to maintain or replace damaged or faulty lifters, dangerous unexpected accidents can take place and the passengers' safety hangs in the balance. When we consider the study on the steel fatigue, we can confidently claim that it is not impossible that the lifters malfunction in a way that it will cause danger if not maintained. One of the basic requirements of companies that provide service to its customers is to ensure that the services are safe to use and pose no imminent danger to them. Therefore, it is the social responsibility of these companies to make sure that the lifters are in good condition. Besides causing harm to its customers, the taxi company will be held accountable and there will definitely be a huge liability on its part. It is always better to be safe than sorry especially when it comes to the safety of the citizens. To avoid any unwanted circumstances, AMIND strongly suggest that a maintenance check be carried out on lifters over a certain period of time.

The proposed legislation could allow taxi drivers to utilize their vehicles to pick up passengers without being mandated to buy new cars after a specific time. Due to this, lifters that are used in taxis are also being disregarded; many taxi companies and drivers are negligent in the repairing and maintenance of

their taxi lifters. In the most recent proposed legislation that awaits approval, taxis will be granted permission to operate until it is no longer road-worthy without having to replace the vehicle every 8 years as the previous law stated. AMIND firmly and wholeheartedly believes that this is dangerous path to embark upon overall but more specific to our field identify there should be a baseline factor for considering the safety of the passenger by ensuring that the lifters on the taxis are well-maintained and repaired on a regular basis. This applies for the safety of the passengers but it also prevents any workplace-related liabilities and compensations claims should an incident occur because of faulty or unmaintained lifters. The lifters require periodic maintenance and ultimately replacement at appropriate time intervals. AMIND believes to have no limitation as to how long a vehicle can be operated as well as the actual lifter itself puts passengers and the public at unnecessary risk when an accident inevitably occurs.

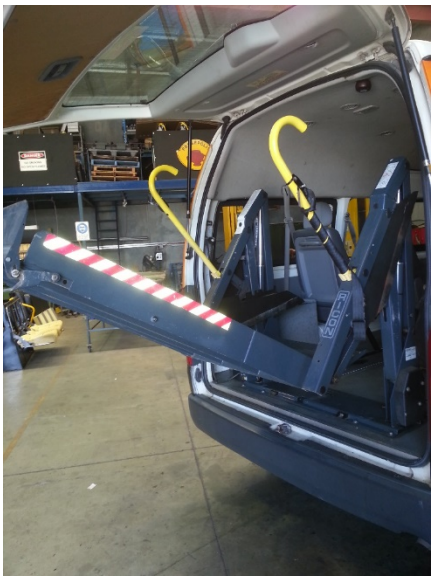
In defense of profit making, taxi companies may argue that it is not economically viable to purchase new vehicles every few years. This is true to an extent perhaps but a limitation needs to continue to be enforced. Hence, assuming the vehicle is still roadworthy and the lifter is in good condition, there should be no problems. To solve the issue of having to purchase new vehicles should accidents occur, it is better to merely maintain and do regular checks on the lifter itself and make necessary repairs or replacement if needed. This step is deemed a lot more profitable and is a wise rule to implement because it not only shows the customers that they are valuable in the eyes of the company but also that the company is honest, trustworthy and plays fair with them. Current customers pay a good amount for special taxis because they sincerely believe that these taxis are reputable and will help them reach their destinations safely with ease as the lifters support them who are seated on wheelchairs. We need to understand that the lifters not only support the wheelchair but the entire weight of the passenger, which is his or her body. The passenger's life is basically dependent on the condition of the lifter. There is great standard of value to be maintained by continually checking the lifters; the taxi companies will have lesser liability which will bring about a better name for them as companies that can be relied upon for the safe method of transporting the physically handicapped from destination to destination.

Words are insufficient to highlight the importance of the lifter in safely transporting the passengers to and fro their choice destinations. Therefore, to emphasize the high importance of maintaining and replacing the lifters and to demonstrate the dangers of a faulty lifter that isn't regularly checked, attached herein is a table showing the images of how the lifters would look like over a period of time if they are not changed or repaired.

Image	Description
	Link: http://www.epi-eng.com/ mechanical_engineering _basics/fatigue_in_metals.htm#types These micrographs show how surface fatigue cracks grow as the material is further recycled by being used and applied pressure to over and over again.
	This image shows a lifter with little dents and it's nearly completely torn after being worn out.

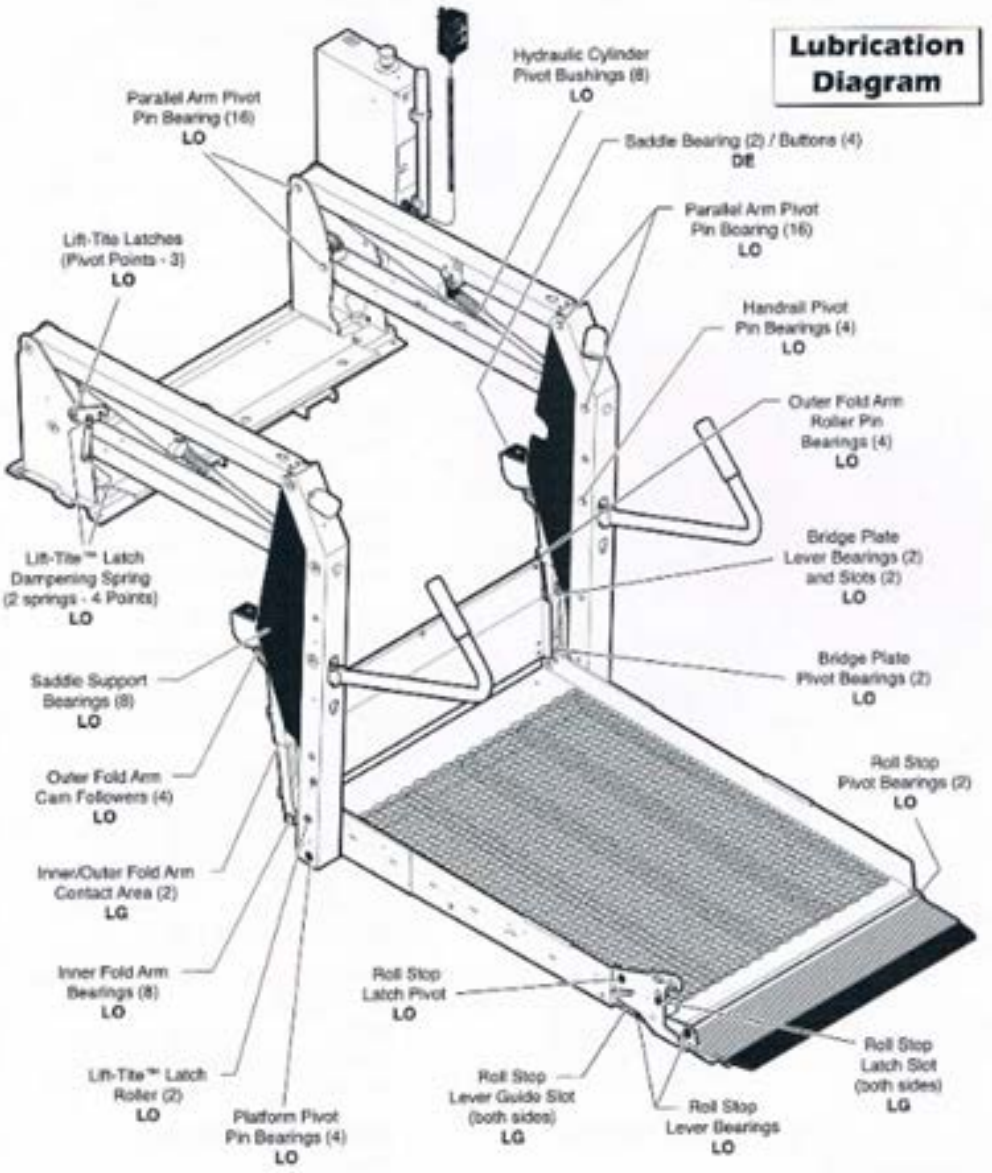
	This image is another example of a lifter breaking apart when too much cyclic loading has been applied to it.
	External Hoist displaying a crack on the lifter bracket which holds the lifter firmly in place beneath the vehicle.

	This picture shows a lifter that is no longer in good condition. It Is worn out, has several cracks and has ripped badly due to over-usage.
	This image is the result of frequent usage on the lifter that has caused it to tear.

	This image is another result of frequent usage on the lifter that has caused it to wear out. There are evidences on the surfaces of scratches.
	This is an internal lifter whereby the blue arms of the apparatus have been cracked from the age and repetitive usage.

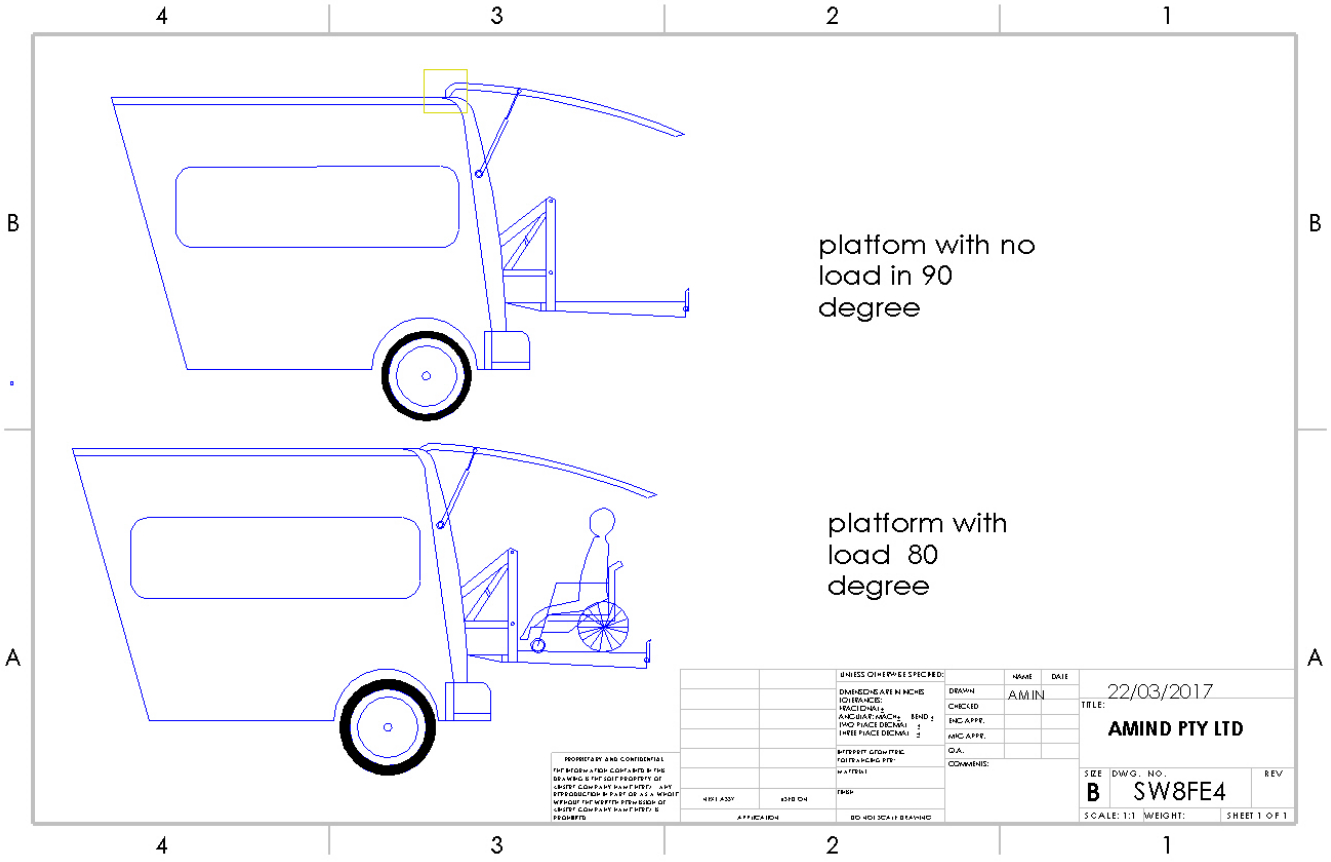
The following image has also been included to show the parts of the lifters and how they can be maintained and lubricated to be kept in good condition for the safety of all concerned.

Maintenance and Lubrication



See the Maintenance/Lubrication Schedule for recommended applications per number of cycles.

Lubricant	Type	Specified (recommended) Lubricant	Available Amount	Braun Part No.
LO - Light Oil	Light Penetrating Oil (30 weight or equivalent)	LPS2, General Purpose Penetrating Oil	16 oz. Aerosol Can	15807
DE - Door-Ease	Stainless Stick Style (lube)	Door-Ease Stick (lube)	1.68 oz.	15806
LG - Light Grease	Light Grease (Multipurpose)	Lubriplate	14 oz. Can	15805



As the above drawing illustrates the lifter will be 90 degrees to the arm but when a load is applied to the lifter it becomes stressed and reduces by 10 degrees. Over time one can see this movement having an impact on the strength of the lifter and signs of steel fatigue become evident.