



CONTINUOUS MOTION, CONSTANT EMOTION

How to Operate 365 days a year

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1. Introduction

The Sugar Loaf Cable Car is one of the oldests Cable Cars for tourism in operation in the world. The idea of installing such touristic equipment came from a visionary Brazilian, Mr. Augusto Ferreira Ramos. He founded the Cia Caminho Aéreo do Pão de Açúcar, obtained the licenses to installation and operation in 1909 and bought the Cable Car from a German company named **J. Pohlig**. It was difficult to find some specific materials. Even the cement was brought from Europe, as it was not available in Brazil. The operation began in October 1912.

As the operation began, the technicians had to keep the cable car in operation with the available resources and knowledge. The biggest difficulty became the relative distance to the manufacturer in Europe. The communication by phone calls was not an option, as they were expensive or even unavailable.

In 1969, Cia Caminho Aéreo Pão de Açúcar renewed its license. Its president, Mr. Cristóvão Leite de Castro, had the challenge to increase the capacity of transport in order to obtain the new licenses.

The cable car was completed renewed in 1972. The new equipment, acquired from the Italian company Agudio, was modern and replaced a 60-year-old equipment. The new cable car increased the capacity ten times.

At that time, the challenge was to keep the cable car in operation every day, in order to meet the demand. The distance to the manufacturers was still a factor that leded the technicians to develop its independence as much as possible.

The cable car that opened in 1972 is still in operation, with some important components renewed in order to keep the state of art. Between the years of 2003 and 2015, the number of visitors increased about three times, from 550'000 to 1'500'000 every year. The challenge now is to keep the high availability. Customers know that the cable car runs daily.

2. The concept of maintenance

The cable car is open every day from 08:00 am to 09:00 pm, which means 13 hours of operation every day. Only for some special maintenance works the cable car is closed. During inspections and some types of maintenance work it's not necessary to stop the daily operation.

Some of the inspections and cares follow a regular plan and are performed during the day, as follows:

- Upkeep of fixed structures, like track cables in the bollard, machine room, cabins etc.;
- Bearing inspection;
- Cable lubrication;
- Others.

Some maintenance and operation works are done during the night, as follows:

- Cables magnet inspection;
- Cables shortenings and adjusts;
- Cabins and machinery painting;

- Building and civil maintenance;
- Bearing changing/lubrication;
- Rescue simulation;
- Others.

The touristic operation has a breakdown only during complex maintenance works. Thus classified are cable-changing, installation of new electronic controls, gearboxes or carriages, etc.

Some concepts should be considered in order to make it possible. Personnel is the first keyword. The technical team and the operational team are not the same, as the maintenance is performed during night and day work. The technical team is now composed by 40 workers. The operational team has 38 workers. Not only the number of workers has to be taken into account. The quality of the workers plays a decisive role. Individual abilities, teamwork capacity and multidisciplinary groups are essential. In Sugar Loaf the technical team is composed by civil workers, mechanicals, electricians etc.

The workshop condition plays a critical role on the maintenance management. The night operations are not possible if there isn't a background structure available. An unexpected damage or failure could be solved in time if you have the right tools, resources, material etc.

To be used to all of these resources, the technical team increases its knowhow by developing many structures and equipments. Examples in Sugar Loaf are:

- Water/Sewer aerial system;
- Material cable car;
- Winches of 3 Ton, 5 Ton and 10 Ton;
- Funicular for disables, etc.

Good maintenance practices have to be used. More predictive maintenance as preventive is a good tool, as it increases the inspection and reduces the interventions; an appropriate software for maintenance is necessary as it optimizes preventive and eventual corrective maintenance. Planning is essential when you have to program complex overnight maintenance operations.

An important action is to take responsibilities. The Sugar Loaf Cable Car Company has a license to operate, to maintain and also to manufacture Cable Cars in Brazil. It brings advanced knowledge in maintenance and operation, as small projects can be developed at home.

3. The results

This development has shown positive results, with very high availability ratio in 2016, as described below:

- Section 1
 - Technical availability: 99,92%

- General availability: 99,68%
- Section 2
 - Technical availability: 99,86%
 - General availability: 99,59%

The most significant result is that the high level of availability is reached with preventive maintenance without shutdowns in the operation during the whole year. The majority of the installations around the world require stops at least for some weeks to an annual inspection. The Sugar Loaf maintenance team has shown that it can be done during the regular operation, safely and reliably.

There are indirect consequences. Visitors not used to cable transportation keep in mind that the cable car is always operating. The trademark Bondinho do Pão de Açúcar means safety. Some suppliers and manufacturers associate our image of availability to their product.

The installation of special equipment, like the material cable car or the small funicular, results in reduced costs. Some types of maintenance, like changing a pulley, could lead to one or two days of shutdown in operation with an external team.

4. Conclusion

The case of Sugar Loaf Cable Car could possibly be applied to other installations. Urban and some touristic Cable Cars have an annual demand to operate all year round, daily. The manufacturers have an opportunity to analyze the client demand and eventually offer new concepts of maintenance.

Interviews with aftersale managers of different companies indicate that there is no other similar operation in the world.

The development of “In operation maintenance” has a very positive economic result. An operational shutdown has a significant impact on the incomes.

Legal conditions have to be considered before following this model of management, as it could limit the autonomy of the maintenance team.