



Kriens, December 2021

Dear Readers

For 25 years MAM has maintained a quality assurance system compliant with ISO 9001 with annual internal and external audits, a business manual and business reports. This is to ensure systematic handling of the various orders and that documentation and data storage are well-structured and secure. Although for six years now, we have dispensed with the costly external audit with SQS, which after the implementation of the quality system and its careful continuation for several years, was no longer particularly profitable, we have nevertheless continued to independently maintain the QA system in the same way. Over the years, MAM has invested a lot of money and working time in the QA system. Unfortunately, last summer a nasty error occurred despite the QA system. As part of the process for the manufacture of the FlexOmega Grip prototype, we sent drawings of the parts to the manufacturing firm (STEP, PDF) to request a quotation. By the time the order was placed, the design had been slightly modified and the updated drawings were enclosed with the order. Of course, all these exchanges took place by email, and the parts were promptly manufactured to the drawings of the quotation request.

At a time of great workload in the industry, this mistake cost MAM a lot of money and a three-month delay in development. MAM sees the cause in the interplay of various factors. During the holiday period, MAM had to deal with three different contact people at the manufacturing company. Due to time pressure, at one point there were insufficient checks at the manufacturing company and ultimately MAM could have counteracted the misunderstanding by means of unique drawing designation.

And the moral of the story: In order to take into account the human factor, it is better to check once too often – despite the QA system.

### Safety factors

Safety factors, reserve factors, safety margins –they are meant to prevent the failure of a load-bearing system. It is always displeasing for engineers to have to produce a bulky, heavy and inelegant design because of unnecessarily high safety requirements.

As an example, take the load suspension device for helicopter transport, commonly known as the suspension cable.

Only two factors can cause a failure:

1. The cable can carry less than expected.
2. The load on the cable is greater than expected.

There is no third possibility. This might seem trivial, but it is fundamental to my statement. The load-bearing capacity of the cable or textile sling can be determined. This requires reliable load tests with statistical evaluations and investigations of the influence of ageing. With these key data, the load capacity of the cable can be declared. The load on the cable is mainly dependent on the movement of the helicopter and the mechanical properties of the cable, which can be ascertained by proper load testing. The maximum cable force can then be determined by relatively simple means. MAM is there to solve this problem, i.e. to prove that the maximum load in the cable is less than the load-bearing capacity of the cable.

A renewed discussion around safety factors would seem appropriate in cases where safety can be ensured by accurate calculations.

We wish you a happy Christmas and a healthy and successful 2022!

Kind regards

Georges Mandanis



Illustration from: *Nine Essential Rules for Helicopter Ground Staff. Instruction Manual*, Suva [Swiss National Accident Insurance Fund]

MANDANIS ANGEWANDTE MECHANIK GMBH

Dynamik – Statik – mathematische Modelle – Produktentwicklung für Innovative Zwecke  
Geschäftssystem nach ISO 9001

Georges Mandanis, dipl. Ing. ETH/SIA – Bergstrasse 113 – 6010 Kriens – Schweiz  
T: +41 312 07 10 – F: +41 312 07 11 – gmmandanis@bluewin.ch – mandanis.ch