Differences between Japanese Characteristics and those of Europeans from the viewpoint of TQM -Ways of thinking at the stage of design and/or development of new products-

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Abstract

In the 11th AQCS(1997), the paper entitled "Statistical Analysis of Baseball Records – Jinx and National Characteristics –" was presented by the same authors. At that time, the differences between Japanese characteristics and those of Europeans, using baseball data were discussed, mainly from the viewpoint of "ways of thinking about chance cause and assignable cause."

In this paper, the authors described also on the same subject from the different viewpoint, "ways of thinking at the design and development stage of new products". From this viewpoint, the difference also be found. It seems that the most significant difference between Japan and Germany exists in the field of aeroplanes design. The German ideas in the field were very unique, therefore the authors classified and named their ideas as:

A) "Quantitative analysis" type idea, and B) "Chemical synthetic" type idea.

The former concept is composed of two ways of thinking:

a) All parts essential for just flying must be used, but

b) All other parts shall be rejected, as far as possible.

The latter concept is that, the all additional parts necessary for the development of the above "purified" original product should be added respectively, depending on the requests of customers. These ideas are outlined using the actual examples of German aeroplane.

1. Prologue

In the 11th Asia Quality Symposium (1997, Tainan), the paper entitled "Statistical Analysis of Baseball Records – Jinx and National Characteristics –" was presented by K. Shingyouchi and T. Miyazu. In the symposium, differences between Japanese characteristics and those of Europeans were discussed, mainly from the viewpoint of "ways of thinking about chance cause and assignable cause." In this paper, the authors also describe the same subject, but from a different viewpoint, "ways of thinking about the design and development stage of new products". From this viewpoint, differences between Japanese characteristics and those of Europeans can also be found. It seems that the most significant difference that existed between Japan and Germany was in the field of aeroplanes design. Therefore, the authors describe in some detail the design and development of aeroplanes in Germany during 1920s – 1945.

2. Ways of developing an idea

Differences between Japanese characteristics and those of Europeans also be found in the developmental stage of new products.

Here, Germany is unique in comparison not only with Japan but also other European countries. Therefore, in this chapter, the German way of developing an idea is explained using some examples of aeroplane design. There are two types:

2.1 "Quantitative analysis" type idea

After WW I , German aeroplane construction was severely restricted by the allied forces. At that time, however, they made efforts to fly by gliders, which were not limited. Their purpose was simple: "just flying". Their way of thinking in order to achieve their purpose was unique;

A) All parts essential for flying must be used, but

B) All other parts shall be rejected, as far as possible.

From this viewpoint, the parts A) are the wings, tail rudder, pilot seat, and control wire. The other parts B), e.g. the fuselage is not necessary for this purpose.

The idea for designing such a simple glider was thus formed, and the actual so-called "primary glider" is shown in photo 1. The glider was very small (wing span:10m, a tare: 90kg), however, the principle of flying and manupulation is exactly the same as that for a Jumbo jet plane. In fact, many German pilots involved in WW II, e.g. "The Battle of Britain" trained with this type of glider in their youth.

I suppose that this way of developing ideas is close to the manner of quantitative chemical analysis. For example, in the analysis of iron ore, all of the gang materials such as SiO_2 ,Al_2O_3 etc. are excluded, and the remaining Fe_2O_3 can be determined. This is the reason why I named the above way of thinking as "Quantitative analysis" type.

The second example of this type is shown in photos 2 and 3 respectively. Photo 2 was one of the most successful reconnaissance planes in Germany during WW II. Its very good field of vision was obtained by the twin fuselage. However one of the fuselages would have been rejected by the way of thinking described above, and in fact, BV141 realized the idea!! I believe that no one except for Germany would have attempted to construct such an asymmetric plane.

2.2 "Chemical synthetic" type idea

During WW2, Germany constructed the world's biggest glider, Me321 (wing span: 50m, payload: 22tons) for the North-African operation etc.. However, there were no towing planes at that time. Therefore, three HeIII-H(photo 4) were used to tow one Me321 and it was found to be very difficult.

The German idea at that time was to combine two HeIII-H at the center wing (Photo 5). This idea was very successful, and aero towing became easier (Photo 6) than that by the former "Troika system". Nevertheless, the engineers were not satisfied, because it was difficult to recover the Me321 after the operation was achieved. They solved this problem by equipping six

engines (700 HP) to the Me321 (Photo 7). Thus resulting Me323 could take off by itself. These developmental process in the case of Me 321 are a typical example of "synthetic type idea". The last example is the story of the world's fastest prop fighter Do335 (photo 8).

From 1944 to 1945, air raids on German cities by the allied forces were getting heavier, day by day. One of the countermeasures taken by the German air force was the construction of heavy, high speed fighters. For this purpose, the Do335 was equipped with two 1800 HP engines in a tandem layout. This special layout yielded some mechanical difficulties, which were eventually overcome and its maximum speed proved to be more than 750 km/hour. On the other hand, at almost same time, Japan was also developing a heavy fighter equipped with two 1800 HP engines in the usual twin lay out. However, the maximum speed was only 600 km/hour or so. This difference should be caused by the difference in the original idea.

Anyhow, at that time, German ideas at the design stage were significantly superior to those of Japan. One of the reasons which may account for such a difference was the difference in characteristics between the two countries, i.e. Germany gave priority to the purpose (end); Japanese frequently give the first priority to the means (not the purpose).

3. Epilogue

In our two reports presented at the 11th and 12th Asia Quality Symposium, the authors recognized the existence of differences between Japanese characteristics and those of Europeans. Such a difference is generally not desirable and should be minimized in the near future, however, the authors are rather pessimistic about the prospect of this, because such a difference in national characteristics has a long history and is also based on each national culture.

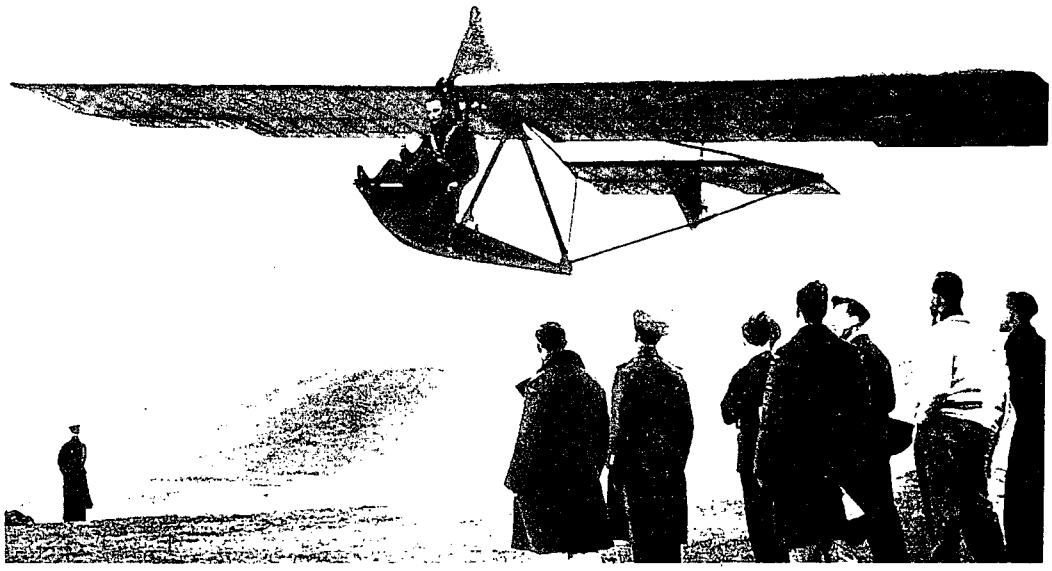

Photo 1: Primary glider

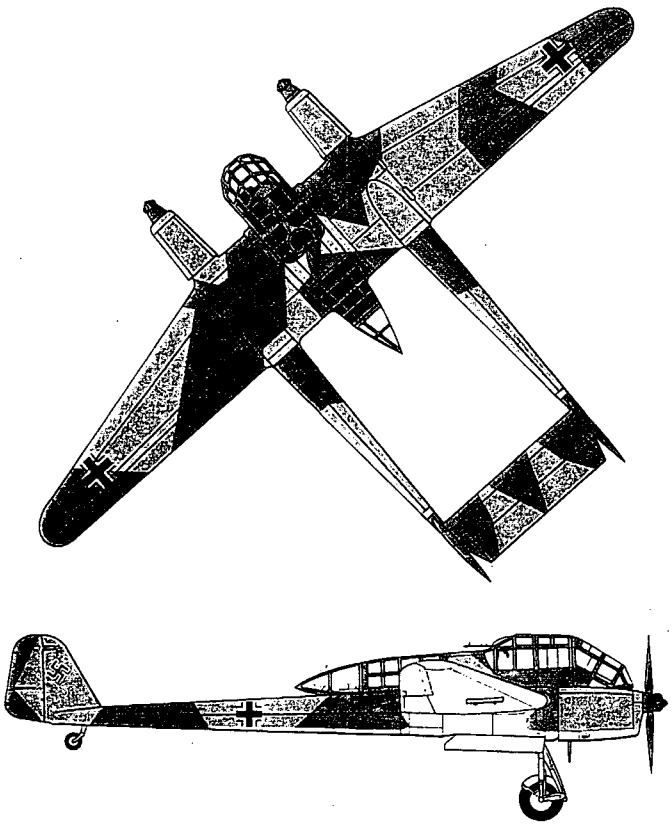

Photo 2: Reconnaissance plane FW189

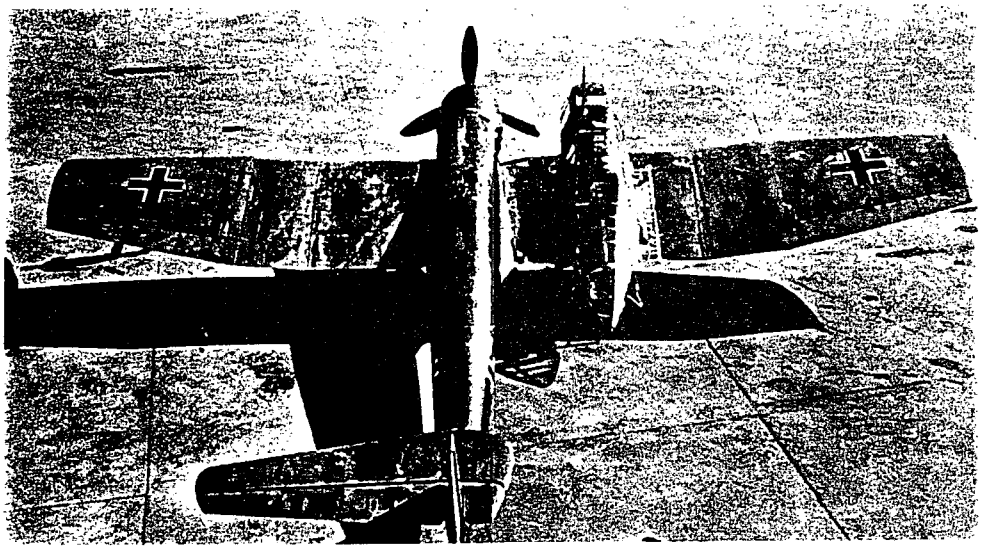

Photo 3: Asymmetric BV148

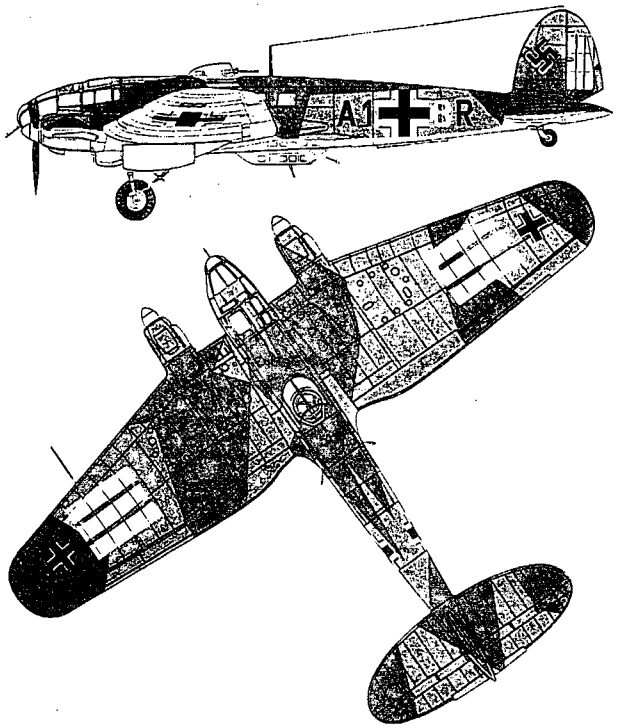

Photo 4: He III -H bomber

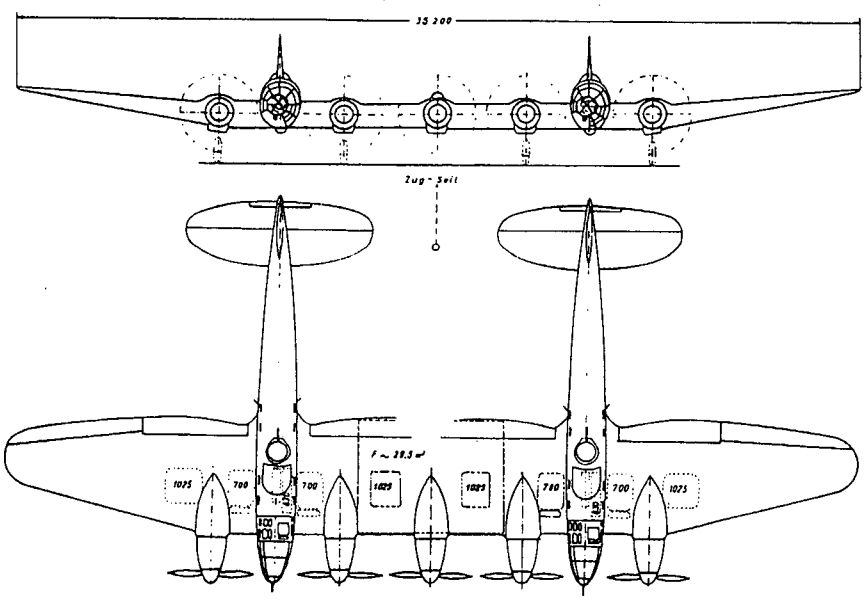

Photo 5: Twin He III -Z

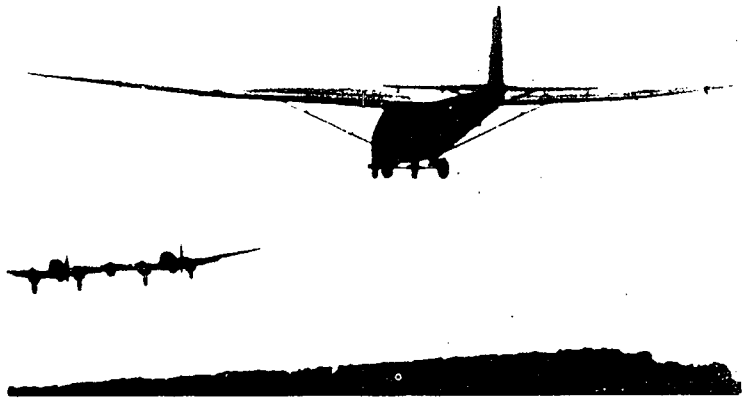

Photo 6: Towing of Me321 by HeⅢ-Z

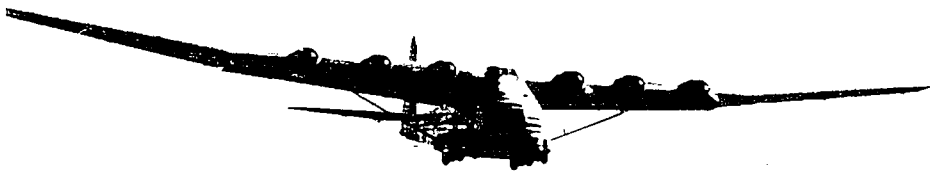

Photo 7: Me323 equipped six 700HP engines

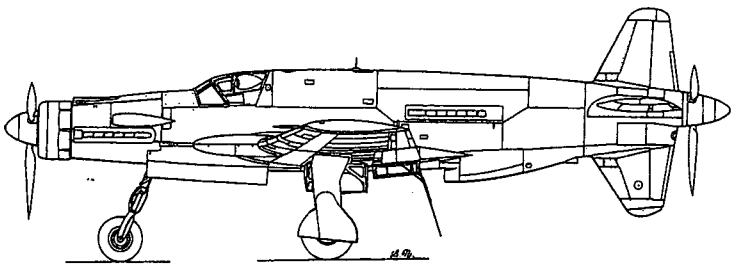

Photo 8: Do335 world's fastest prop fighter