Error Budget User Guide

In the process of designing a new machine, the designer starts with ideas, sketches, quick calculations (at least first order guestimates) of feasibility, but then before investing a lot of time in solid models and finite element analysis, a method is needed to more deeply consider in a deterministic way the performance of different concepts either wholly or partially (a particular axis). The error budget must allow for the assessment of geometric errors and elastic deformations. This document will guide users through using the spreadsheet by applying it to a bridge style machine.
ORIGEN

PDI

Attachment
Stiffness to
NEXT CS's POI

Compliance
CS's POI
to its C.O.S
(Center of Stiffness)

CS_1

Collet Tool Tip

K[Collet] C[Tool]

CS_2

Spindle (shaft) Center

K [Spindle bearing & mounting bolts] C [Spindle shaft]

CS_3

Z Bearing C.O.S, Spindle Center

K [Z bearings] C [Z axis tube]

Length Changes!

CS_4

Y Bearing C.O.S

K [Y bearing, Bolted joint to Y axis block] C [Y axis block]

2 bearings C.O.S

Structure is a CHUNK!
First step: Error allocation