

Case Study 1110-U133

REQUIREMENTS

A major Server Rack manufacturer was designing a new lower cost data center cabinet.

The rear doors face onto the narrow “hot aisle” in most data centers. The most popular versions of the rack would have overlapping “french” doors.

In order to get maximum access to the equipment in the rack the doors had to open 180° and be easily removable.

SOLUTION—Function

The “premium” rack from this manufacturer uses the emka 1110-U122 hinge. It is attached to both door and frame by screws.

This hinge meets both requirements; it allows doors to open the full 180° even when in a row of similar cabinets.

It allows easy door removal and replacement, with a normal lift-off hinge replacing a door 6’ high requires two people, with this hinge design the door slides into position in a simple one-man operation.

SOLUTION—Cost

Cost reduction was the objective of the redesign, how could this be accomplished?

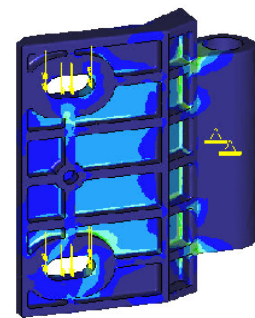
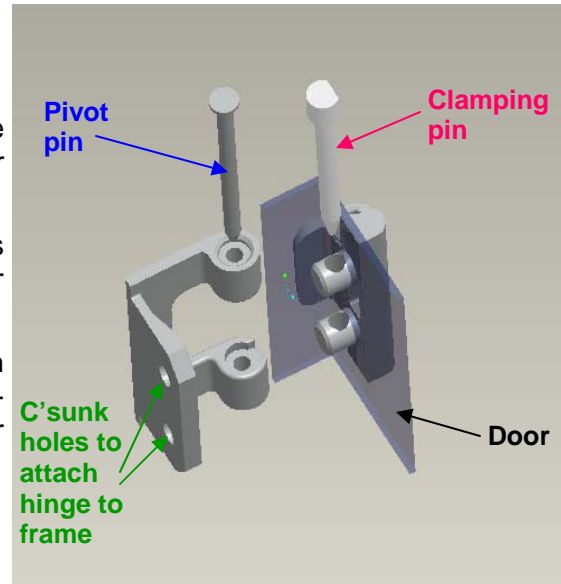
From our experience with hinges in general (EMKA makes over 80 styles of hinge) we know that a very significant part of the total installed cost of a hinge lies in the installation.

We recommended one of EMKA’s tried and proved low cost installation systems; because of lack of room for access we could only use this for the door part of the hinge.

In the adjacent drawing the light colored pin is tapped down to lock the hinge into position on the door.

Cursory examination of the hinge indicated that the highly stressed part is the bottom arm of the frame part. This and the fact that the door part is relatively lightly loaded was confirmed by Finite Element Analysis (FEA).

The door part was targeted for cost reduction, EMKA’s standard 30% glass reinforced nylon was tried but it was concluded that the deflection would cause marginally acceptable door sag, we then substituted the parameters for our 50% glass material. This proved entirely satisfactory, deflection of this significantly stiffer material was well within limits, the surface finish was excellent and the calculated production rate offered significant cost reduction.



Example of stress analysis diagram