July 2022

A-SID BINDING PREVENTION BY HEATING

HP INC

A-SiD Binding Prevention by Heating

Abstract

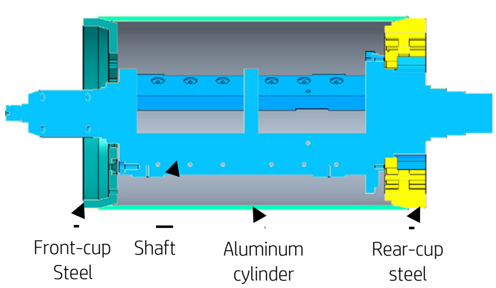
In the printing industry, and even more specifically in the digital printing industry, the use in highly accurate printing cylinders with small runout is very common. To meet accuracy demands and allow simple and easy removal for maintenance purposes, the printing cylinder is usually positioned upon 2 tapered areas.

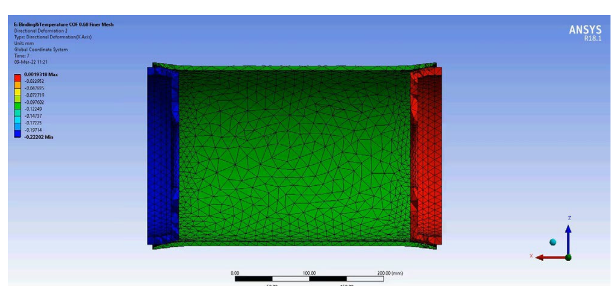
The Challenge

To allow easy installation, meet accuracy demands and having proper mounting shallow taper cone angle is usually used. However, shallow taper cone angles significantly increase the risk of binding - the phenomenon of tapered cylinder firmly attached to its mounting elements. The amplitude of the binding is mainly affected by the following parameters:

- Materials (coefficient of friction and thermal expansion)
- Taper angle
- Tolerances and misalignments

In the print industry, the installation temperature is ~22-28°C, and the max working temperature is ~40-50°C. If a printing cylinder is made of aluminum and its mating mounting part is made of steel during work, the aluminum expands more than the steel. Since there is a preload force between the 2 steel tapered parts and the printing cylinder, as the temperature rises, the mating parts “penetrates deeper” into the printing cylinder. When the temperature cools back down (e.g., for maintenance purposes), the thermal “shrinkage” of the Aluminum cylinder upon the steel mating parts, together with taper angle, coefficient of friction and misalignments creates a very significant binding that cannot be released manually due to thermal stresses. Usually hammer impacts are required. As the printing cylinder is very brittle and fragile, hammer impacts are not acceptable, and decreases the level of user experience.





The invention

By adding a heating sequence to the printing cylinder just before removal, we will be able to release the thermal stresses that binds the cylinder and the steel cups together. The required temperature for easy removal is just few degrees higher than the working temperature, ~5-10°C, which is a safe-to-

touch temperature, and the concern of an operator burn-wound is low. The printing cylinder heating can be done, similarly to the way it is heated during printing mode, from the digital press elements, for example, hot blanket etc. The heating sequence will be part of the printing cylinder removal wizard and will not require the operator for any further operations. After heating, the removal of the printing cylinder is manually, as the binding is released.

Advantages

- **Improve TCE** - Allow simple manual printing cylinder replacement without using dedicated tools.
- **Improve lifespan & CPP** - Remove the risk of mechanical damage to the very expensive, brittle, and fragile cylinder due to hammer impacts or other "violent" removal procedures.
  In addition, the risk of damaging other press sub-systems is reduced.
- **No hardware development** - Eliminates the risk and associated costs of new hardware development while providing significant benefits. Easy tests and implementation, only software parameters modifications are required. To implement the heating sequence.

Summary

This document discloses a very simple and user-friendly solution for the phenomenon of taper cylinder binding, which does not require any new hardware development or complicated procedures.

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