

## **DEVELOPMENT AND APPLICATION OF A MECHANICAL PLUG FOR CAVERN NECKS WITH LARGE DIAMETERS - THE “SPIDER PLUG“**

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### **Abstract**

A hydraulic separation between a well and a cavern can be necessary for different work over applications, e. g. casing milling or casing cementation. The separation is needed to ensure the circulation of mud during such operations. In that case a barrier is set after flooding the cavern, which will be used as a mechanical abutment for the cement bridge. If the diameter of the cavern neck has been enlarged by unintentional leaching processes or by unstabilized under reaming operations, it might be impossible to set a standard plug into those diameters with conventionally available technologies. The limiting factor is in most cases the inner diameter (ID) of the last cemented casing. To enlarge plugs for more than +25% of the normal outer diameter (OD) is not possible or technically not recommended.

Therefore UGS GmbH has developed a mechanical plug, which is hydraulically set with a setting tool and running down the hole with a standard drill string. The so called “Spider Plug” is used as basis for a cement bridge and can be removed by drilling after the work over has been finished.

Depending on the dimension of the setting tool a cavern neck up to 50'' diameter can be plugged with the “Spider Plug”. The option to change the plug dimension on site without further workshop activities allows an immediately reaction on a changing subsurface situation.

The enlarging capability of more than 100% of the original setting tool-OD allows to plug cavern necks with large diameters, which are only reachable through a relatively small casing ID.

Up to now a number of successful operations on different locations have shown that the “Spider Plug” is a practicable and cost-efficient solution for a mechanical abutment of large cavern necks.

**Key words:** cavern neck, plugging, large diameter, mechanical plug, cement bridge, abandonment, well repair