Comments from Horst Aschenbroich, Con-Tech Systems LTD

Pre-stressing (external) of MP against soil shall only be done for new construction.

This will pre-load and pre-compact the soil. Internal post-tensioning, as it can be used with the hollow ISCHEBECK / TITAN bars (see IWM Ube paper K. Stollenwerk / Aschenbroich), will pre-load and pre-compress the pile. This will reduce elastic movement of the MP and such increase the capacity.

Field welding on piles shall be avoided because of difficult job site quality control and inspection.

If GEWI steel bars are used with couplers, because of the large tolerance movement in the thread, lock nuts shall be used and tightened with hydraulic torque wrench. Installation vibration will otherwise loosen the bars inside the couplers, resulting in excessive movements.

Information on driven Pipe Piles is well known. I believe what Prof. Fred Kulhawy was referring to is load transfer test data for drilled and grouted MP.

It was mentioned that SOILEX anchors do not require corrosion protection, because the anchor bulb is in compression. The free stressing length is in tension and will also require corrosion protection.

In General:

We shall differentiate between the different Micro Pile Types.
As I mentioned above, technical data for driven steel piles is well known and these piles are only end bearing piles, documented in all kind of steel pile literatures and within other associations.
What we are concerned about is the relative new breed of friction Micro Piles, drilled and grouted up to
may be 300 mm diameter, single or in groups, in lieu of large diameter drill shafts for retrofit works or new construction where limited access and overhead is a problem.

As it is proposed in the new FHWA (US) Implementation Manual Types A, B, C, D, (all drilled and grouted) these types differ between each other by their installation procedures.

The ISCHEBECK / TITAN Micro piles for example shall be added as an additional Type. It is a dynamic grouted friction MP which differs totally from all other piles because of its unique installation procedure. It forms an integrate fusion over its entire length with the surrounding soil during the continuous single step drilling and dynamic tremi grouting process. Many tests have proven that the load transfer in skin friction with the TITAN Micro Piles is much higher (at least 2 times) than with other drilled and grouted piles.

the TITAN pile length can therefore be shortened under same load conditions.