

Tensioning of Spanlines: Flying Foxes, Tyroleans, Zip Lines, Cableways, Highlines

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- Decreasing sag increases tension in spanline.
 - **Never over tension the rope!** Always observe the SWL of the weakest link in the spanline.
 - Minimum sag = 5%. At 5% sag, Tension = 5 x Load.
 - Rope tension is inversely proportional to the sag. Therefore, at 10% sag, Tension = 2.5 x Load; at 25% sag, Tension = 1 x Load.
 - Tension the spanline when it is loaded with the maximum load it will be required to handle. If the rescue load is not ready to lift when the spanline needs to be tensioned, use an equivalent dummy load for tensioning.
 - When tensioning, limit the number of haulers so the SWL is not exceeded. Haulers (1:1 MA) must be limited to the lesser of: 1 hauler per 10kg of load (this will produce 5% sag), or the **SWL/50¹** of the **weakest link** in the spanline (to avoid overloading).
 - Once the spanline has been tensioned, release the haul to load the anchor, and then re-tension. There will be significant stretch/slip to take up.
 - Keep the spanline as simple as possible. Fewer links means less to rig, less to check, less to go wrong. Keep it simple! The simplest spanline is a rope with tensionless hitches around a bombproof anchor at each end.
 - Use the minimum tension or maximum sag possible. The reduced loads reduce the risk of failure. For cableways (inclined spanlines used for structural rescue) a single rescuer with a 3:1 MA can provide adequate tension (<50% SWL of rope).
 - If when the spanline is tensioned, the sag is excessive there are several possible solutions:
 - Persevere by lifting the spanline by hand at edges to help clear obstacles (this effectively reduces the span!);
 - Replace the spanline with one capable of carrying more load;
 - Reduce the load (e.g. no litter attendant);
 - Run a second spanline in parallel, on double pulleys to halve the load on each rope;
- **But NEVER increase the tension above the SWL, or reduce the sag below 5%!**

¹ Based on the average rescuer being able to haul and hold 50 kgs in a static pull.