Three decay parameters, α_Ξ, β_Ξ, and γ_Ξ, describe the decay process of $\Xi^- \rightarrow \Lambda p^-$. The parameters, α_Ξ and γ_Ξ, have been precisely measured, but not β_Ξ due to low statistics. The *HyperCP* experiment (Fermilab E871) has collected the world's largest sample of polarized Ξ^- decays (130 million polarized Ξ^- after event selection). This would allow us to pin down the β_Ξ parameter and thus have a better measurement of the strong phase shift δ: $\tan \delta \approx \beta_\Xi / \alpha_\Xi$. A theoretical uncertainty in predicting the size of CP-odd effect in Ξ decay would be eliminated. We will report on the measurement of Ξ^- polarization and β_Ξ parameter.