

دانشکده فنی و مهندسی
دانشگاه شهید شاهزادی
باهنر کرمان

NICICO

مجتمع مس سرچشمه



مرکز حقیقات فرآوری مولادکشے گر
Kashigar Mineral Processing Research Center



در دنیا چه خبر؟

نگاهی به کنفرانس بین المللی آسیا های نیمه خودشکن (SAG 2019)



سابقه کنفرانس

- برگزاری در ۳۰ سال گذشته هر چهار سال

- در ماه سپتامبر و در شهر ونکوور کانادا

- تعداد شرکت کنندگان ۹۰۰ نفر

- تک سالن



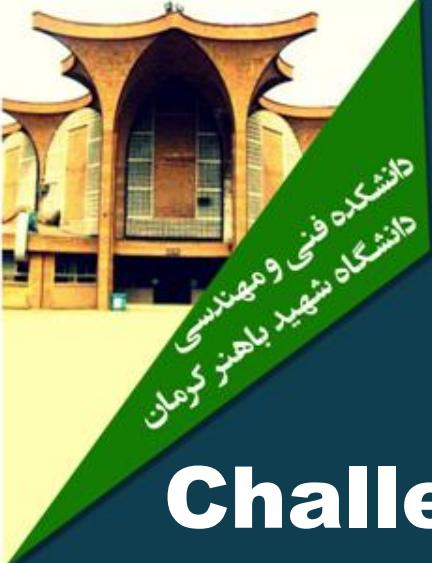
مرکز تحقیقات فرآوری مواد کاشیگار
Kashigar Mineral Processing Research Center

عنوان های موضوعات کنفرانس



- کارایی انرژی
- راه اندازی و بهینه سازی
- کارهای آزمایشی
- ژئومتالورژی و معدن تا کارخانه
- طرح مدار خردایش
- آستر
- مدلسازی و راگ
- موتورها و نگهداری
- کنترل فرایند
- آسیاکنی ریز





مرکز حقیقات فرآوری مولاد
Mineral Processing Research Center



Challenges of Using Advanced Control Tools (ACT) System at the Sarcheshmeh Copper Complex SAG Mill Circuit

**O.R. Bashiri, M. Maleki-Moghadam, A. Akbari, M. Yazdani,
S. Banisi**

Our Wish: Autopilot ≡ Auto Plant Runner



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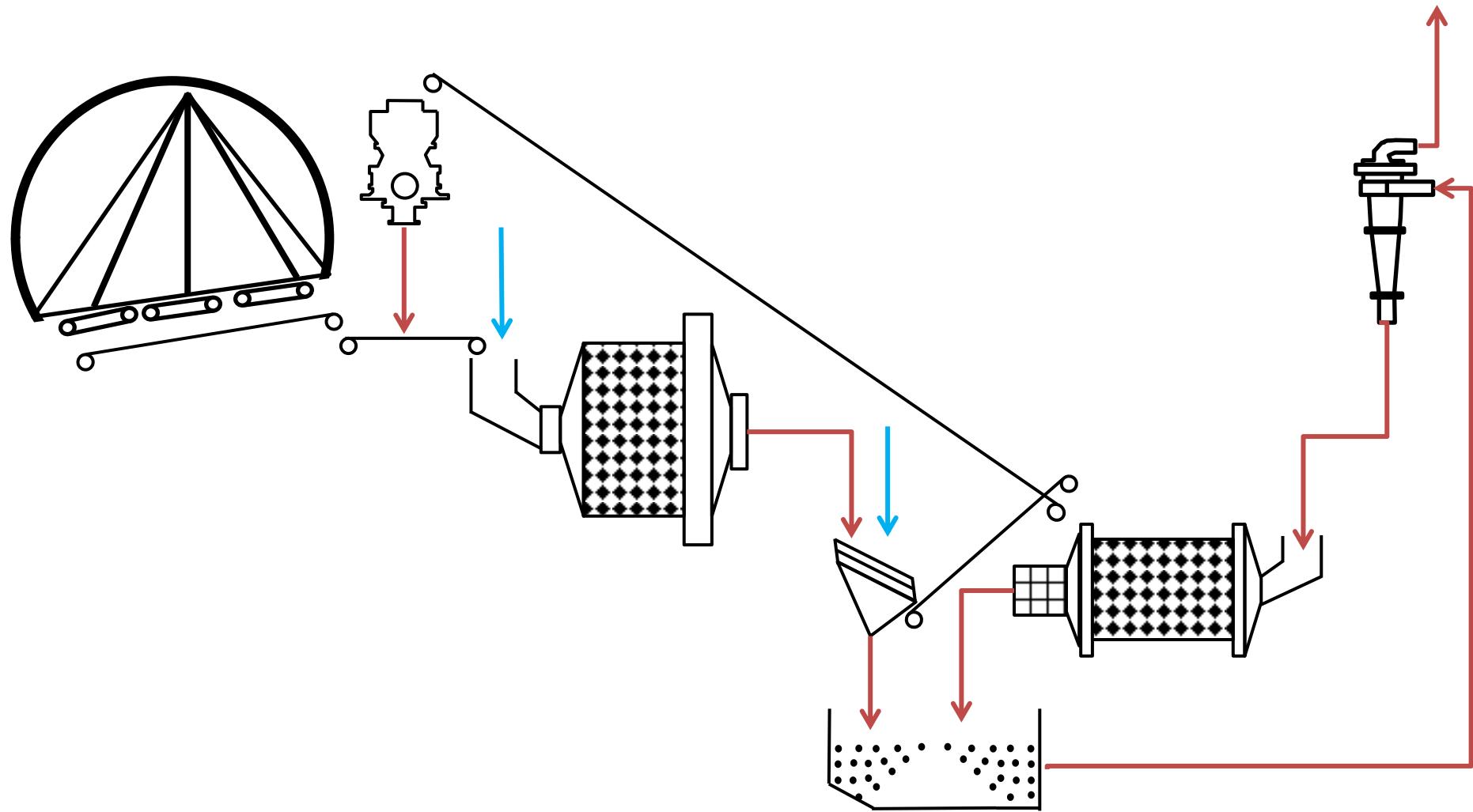
The Bitter Reality

Our Expectation and Reality

There are four bird houses in the backyard. If you make the birds pay rent, the property will pay for itself no time.

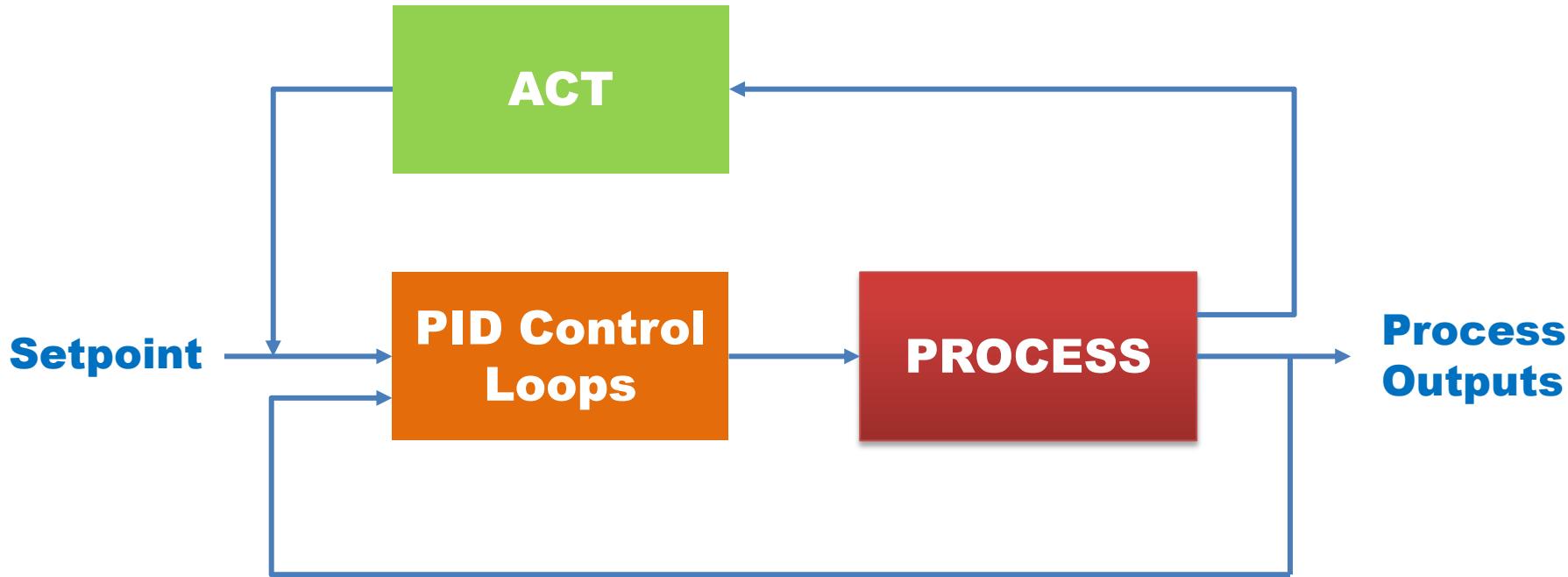


The Sarcheshmeh Copper Complex Grinding Circuit



Advanced Control Tools (ACT)

**Conversion of practical process knowledge
to simple rules of process control**



**Manipulation of setpoints, activation of
motors and valves**

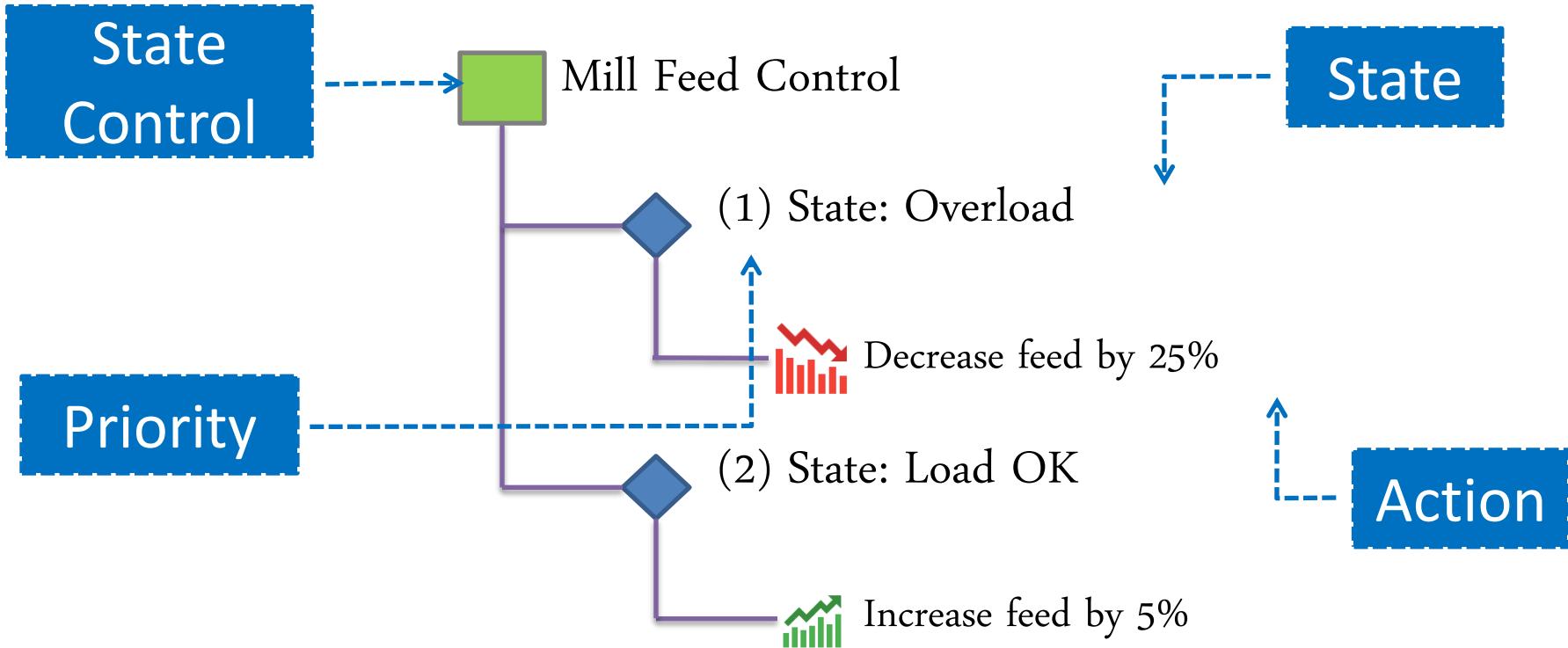


State Logic Control

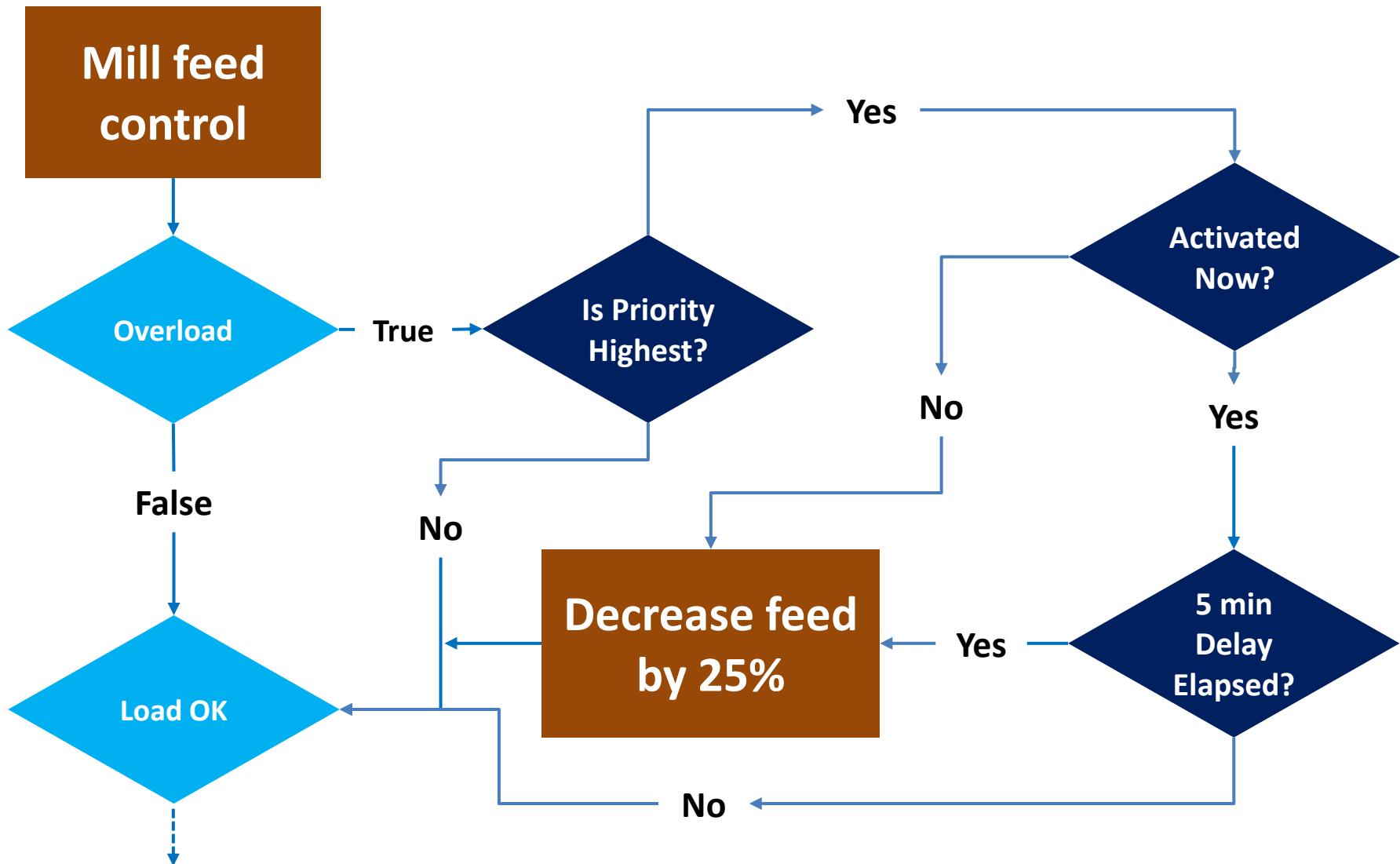
- If SAG mill weight is too high,
increase SAG mill speed by
 - 1% every 2 min



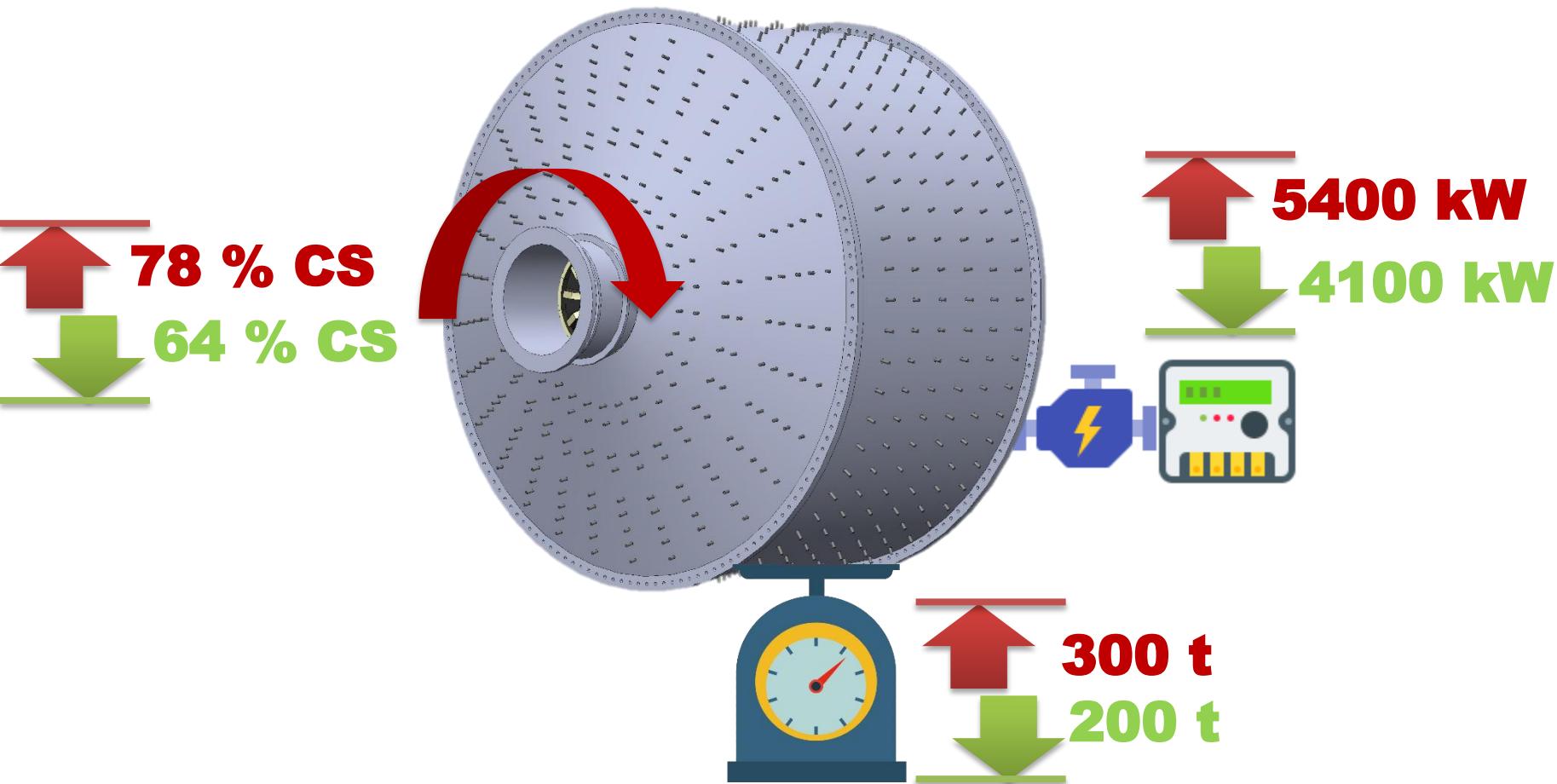
State Control Basics



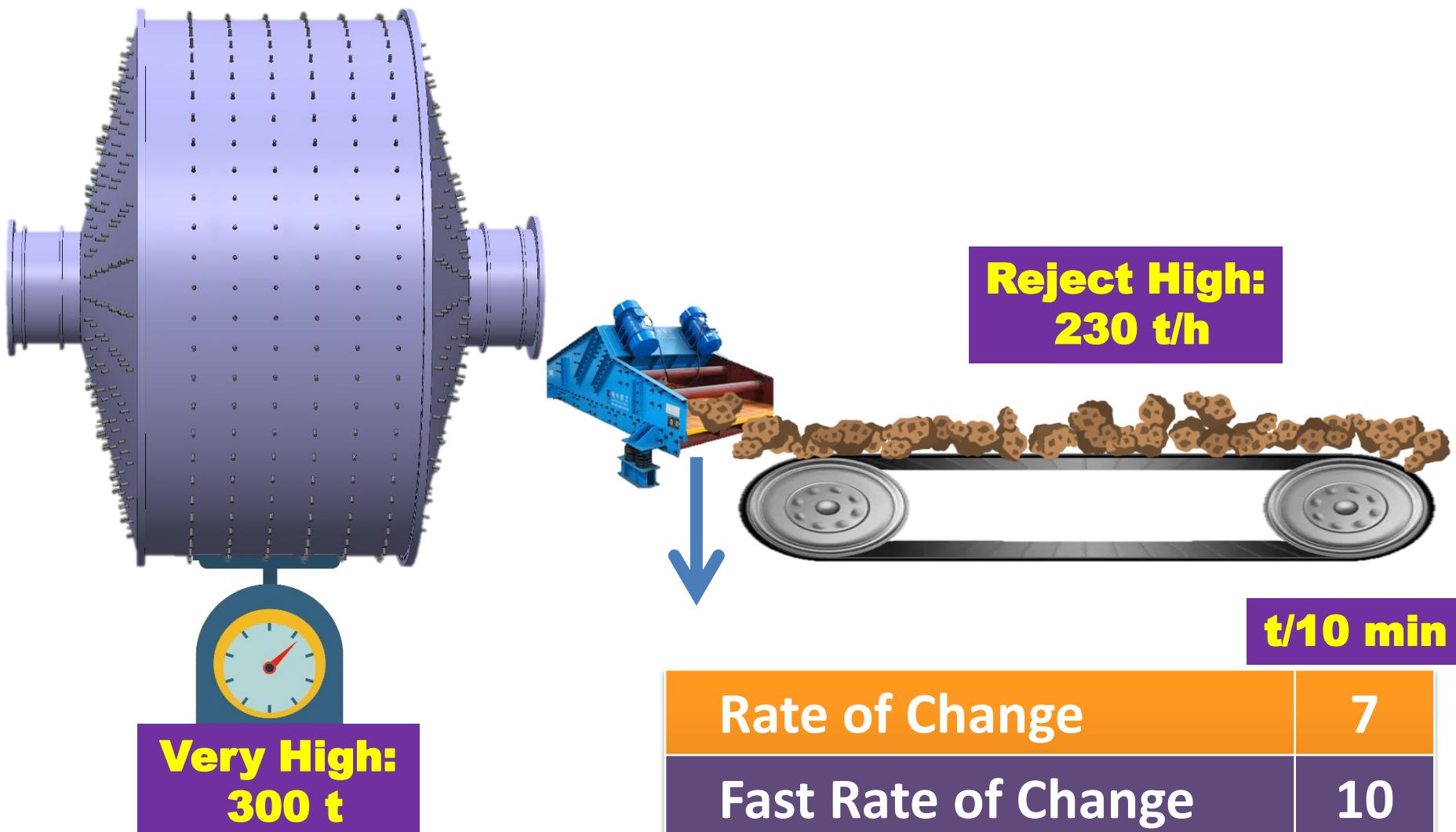
Execution of One State Control in ACT



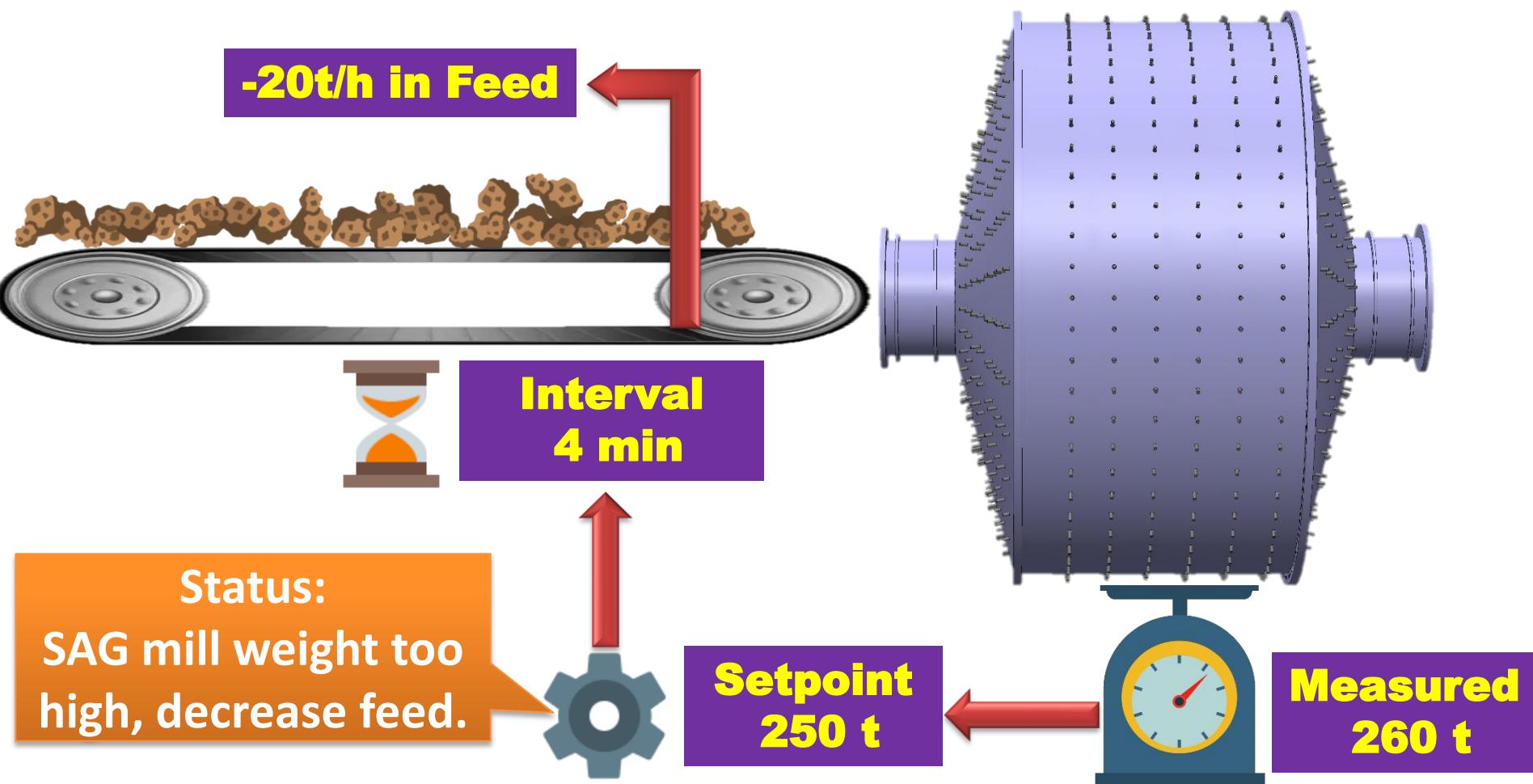
A key step: Definition of Control Limits



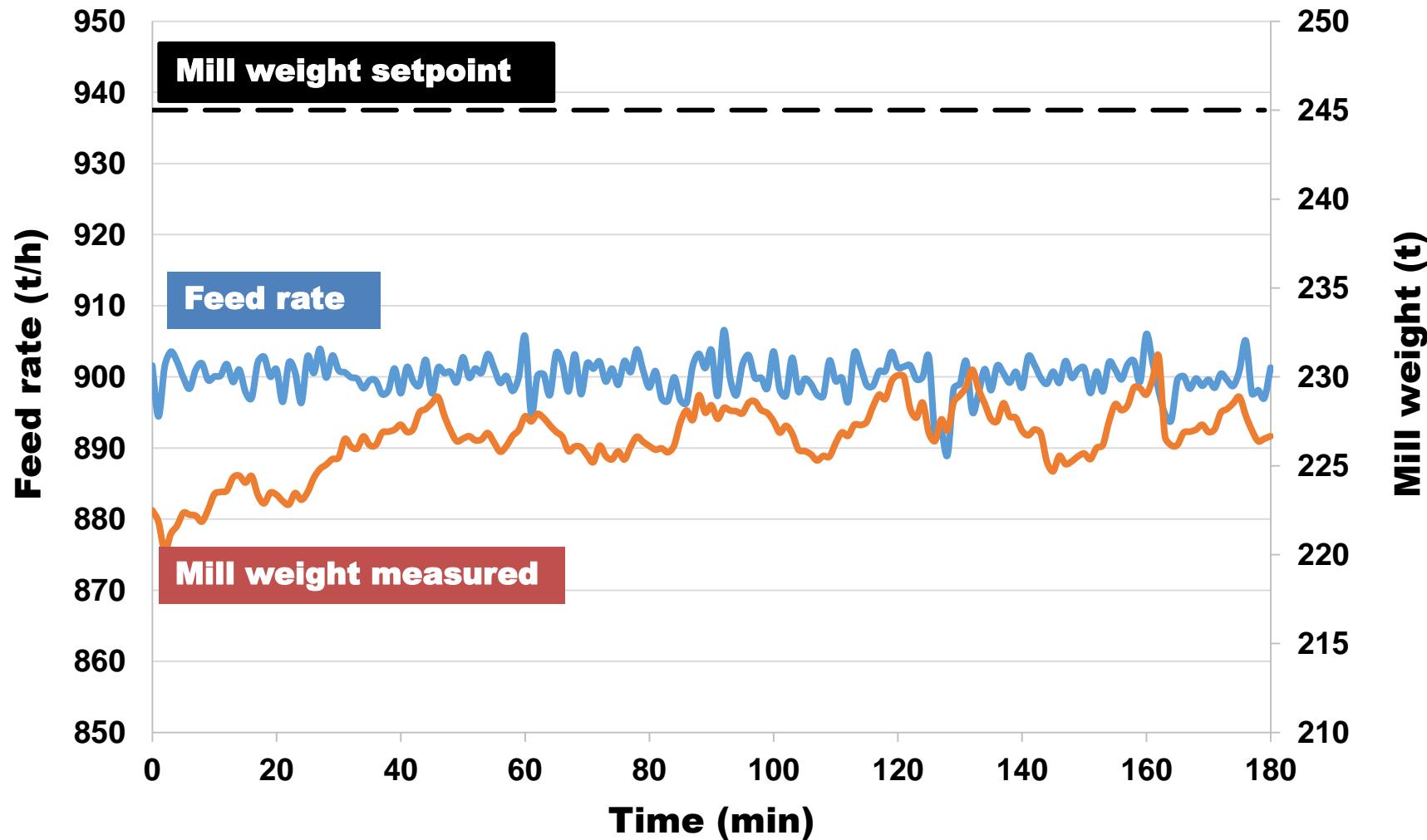
Importance of Definition of Logic Limits



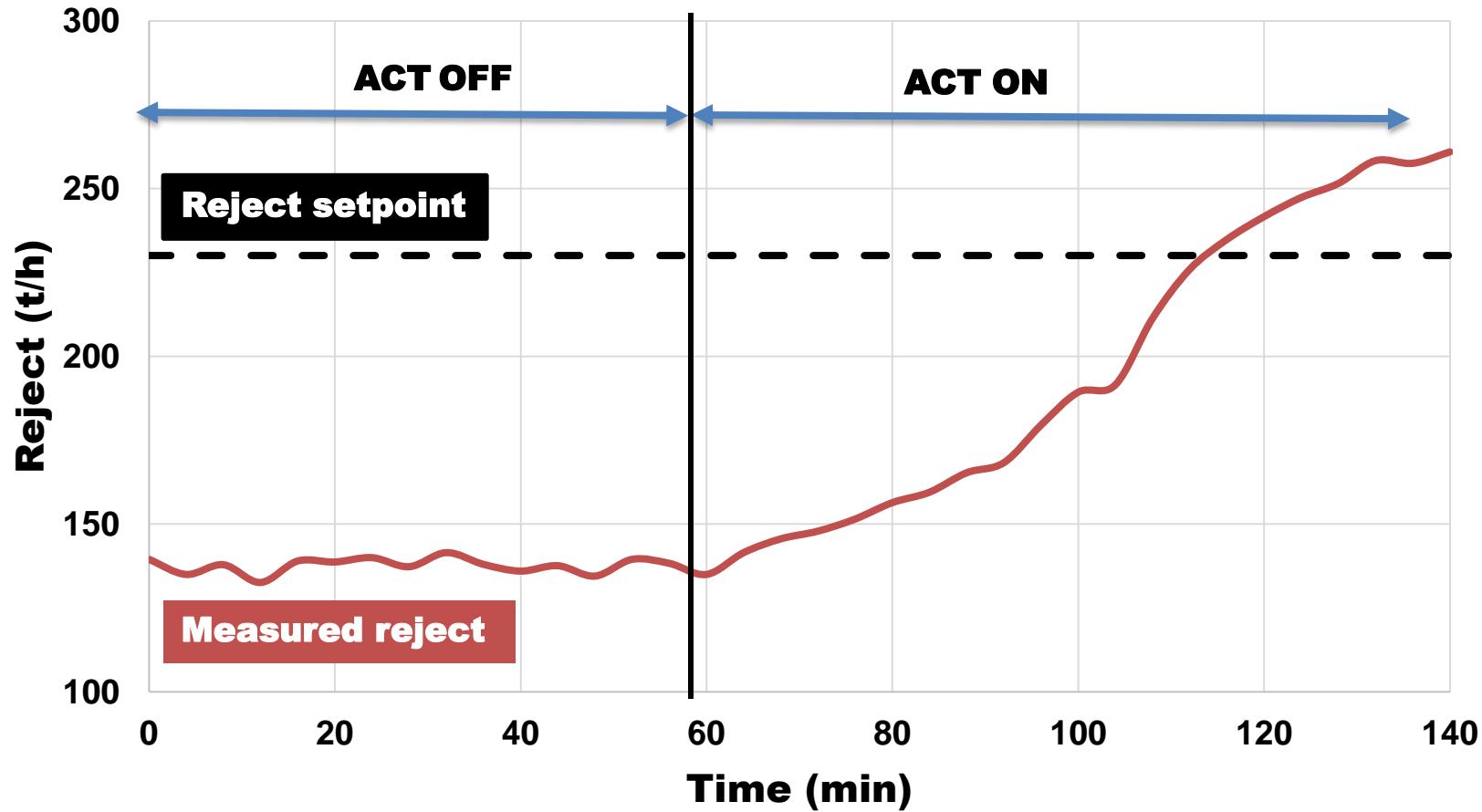
Example: Mill Weight Control



Unable to control: Who is the guilty?



Unable to control: ACT's or Operators' Fault?



Two cases of failures in control: The Verdict

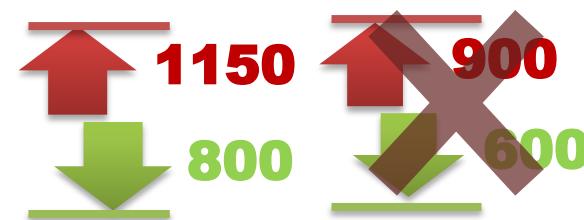


**Forget about the ACT;
Put it in manual**

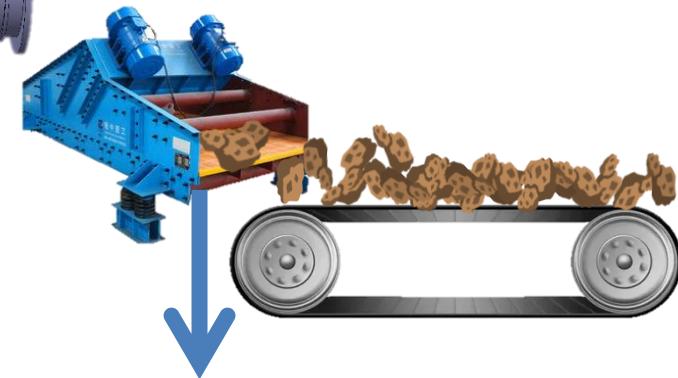


Example: Mill Weight Control

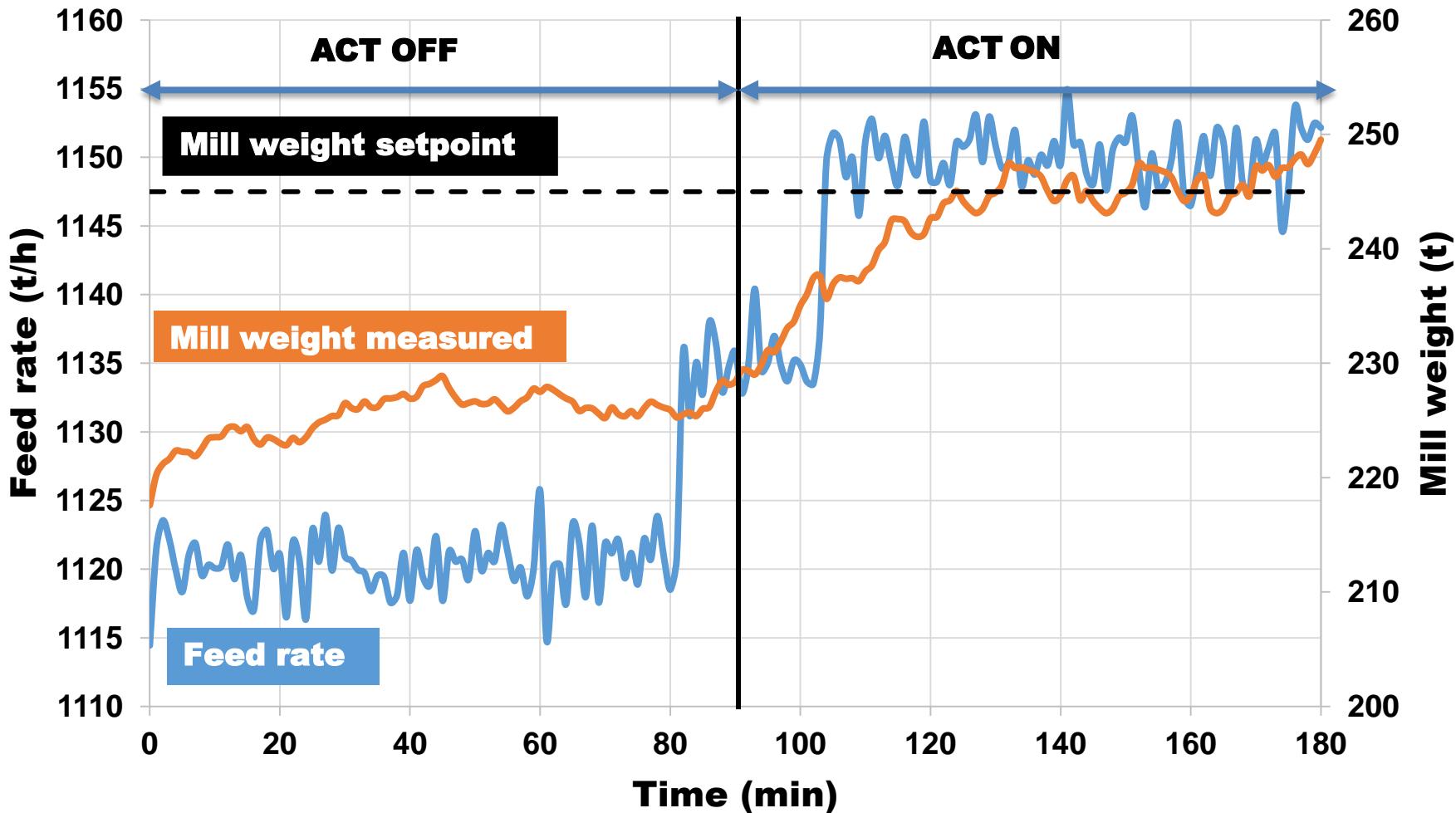
Feed Rate (t/h)



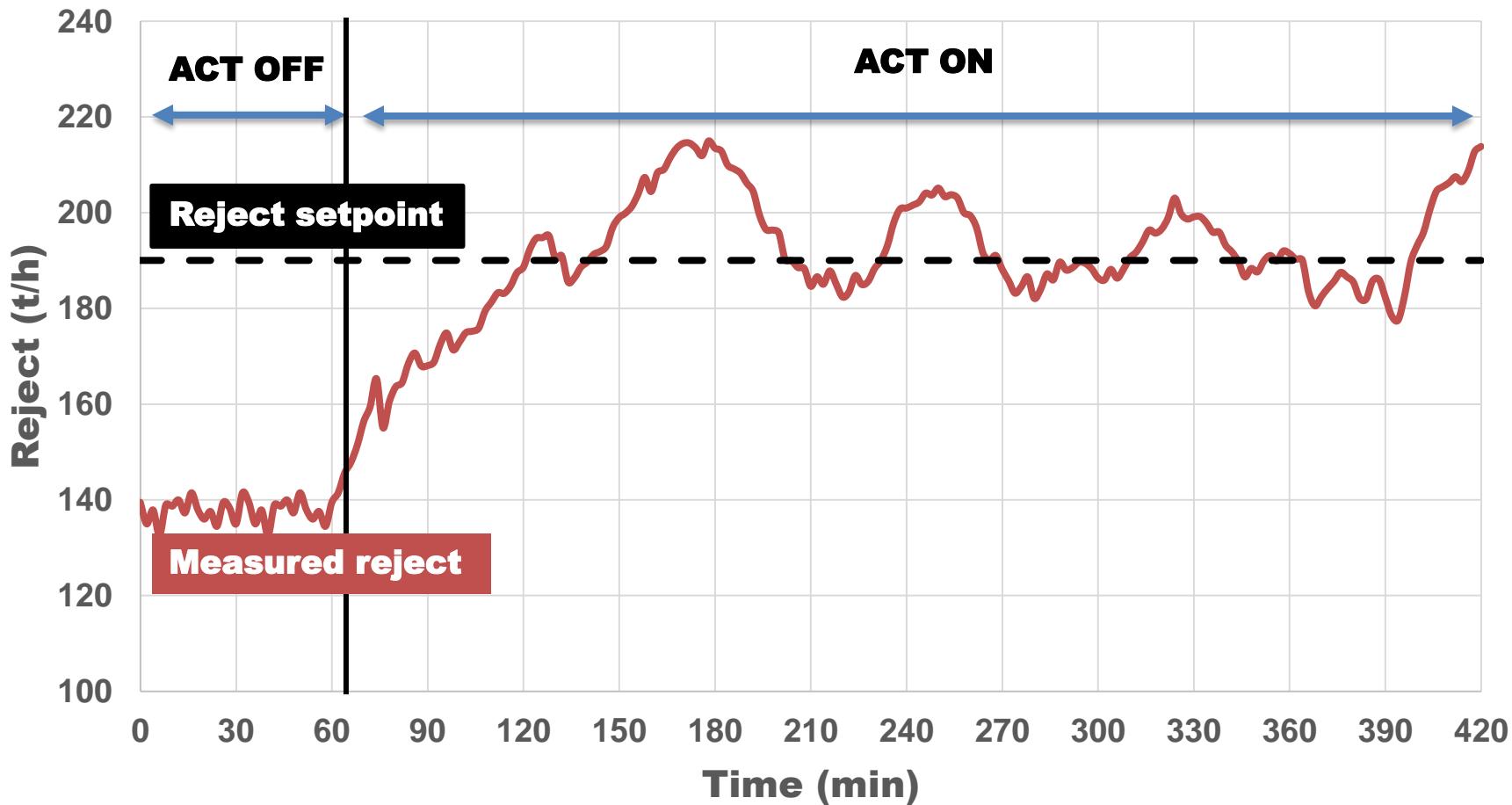
Reject (t/h)



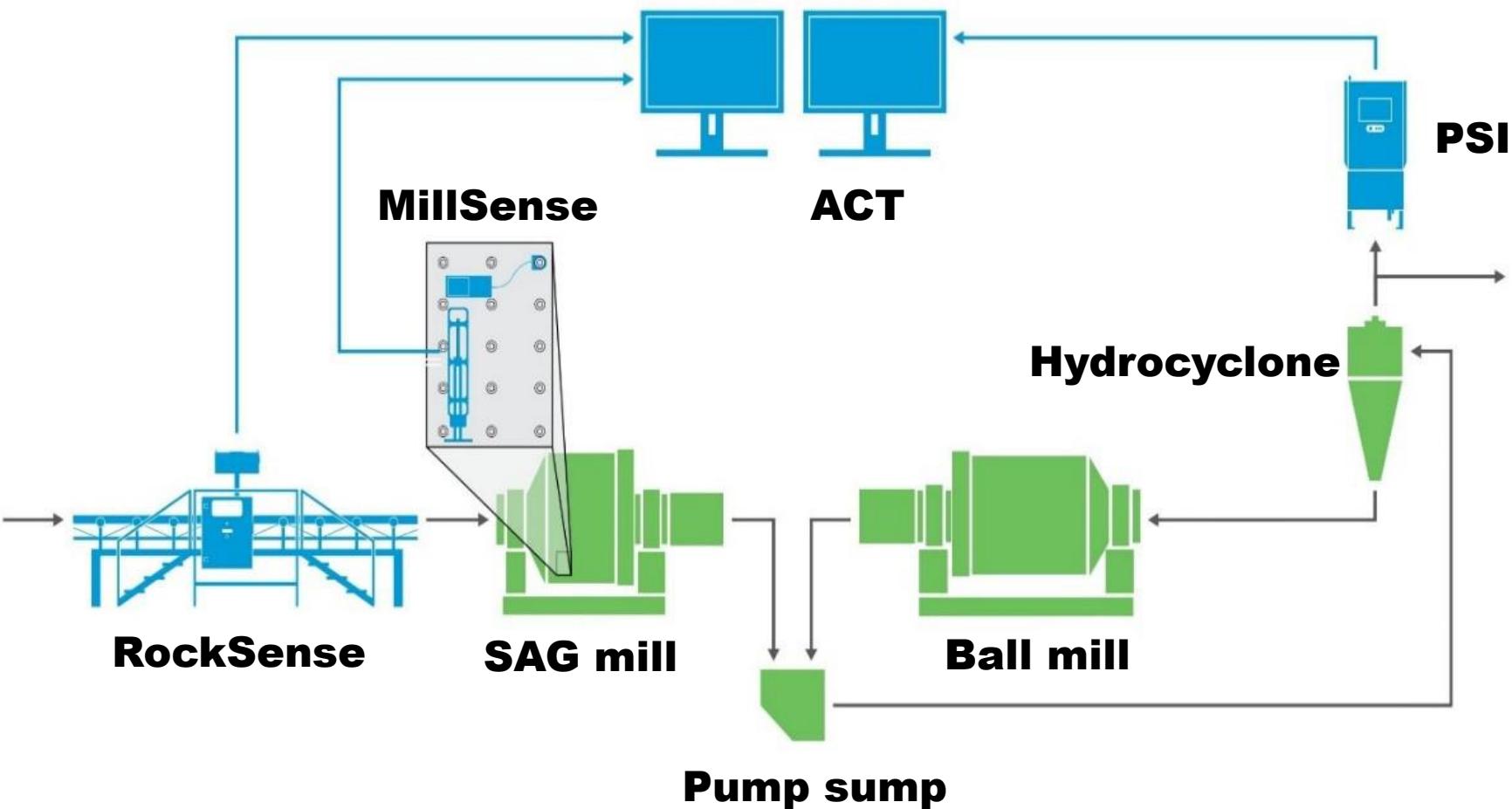
Now looks better!



ACT is doing well!



Ideal View of ACT Function at the Grinding Circuit of the Sarcheshmeh Copper Complex



Conclusions

Without intelligent involvement of operators no control systems could help your plant, even the ACT



Acknowledgements

- **Sarcheshmeh Copper Complex**
- **Shahid Bahonar University of Kerman**
- **Vali-E-Asr University of Rafsanjan**

