Next Two Steps in Improving HMA

56th Annual Bituminous Conference

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Illinois Dept. of Transportation

Illinois Department of Transportation

Next Steps in HMA Improvement

HMA Quiz

1. What is the leading HMA distress driving pavement rehabilitation?
   a. Loss of Friction
   b. Wheel Path Rutting
   c. Raveling
   d. Premature Cracking
   e. Raveling & Cracking at the Centerline Joint


DAMON'S

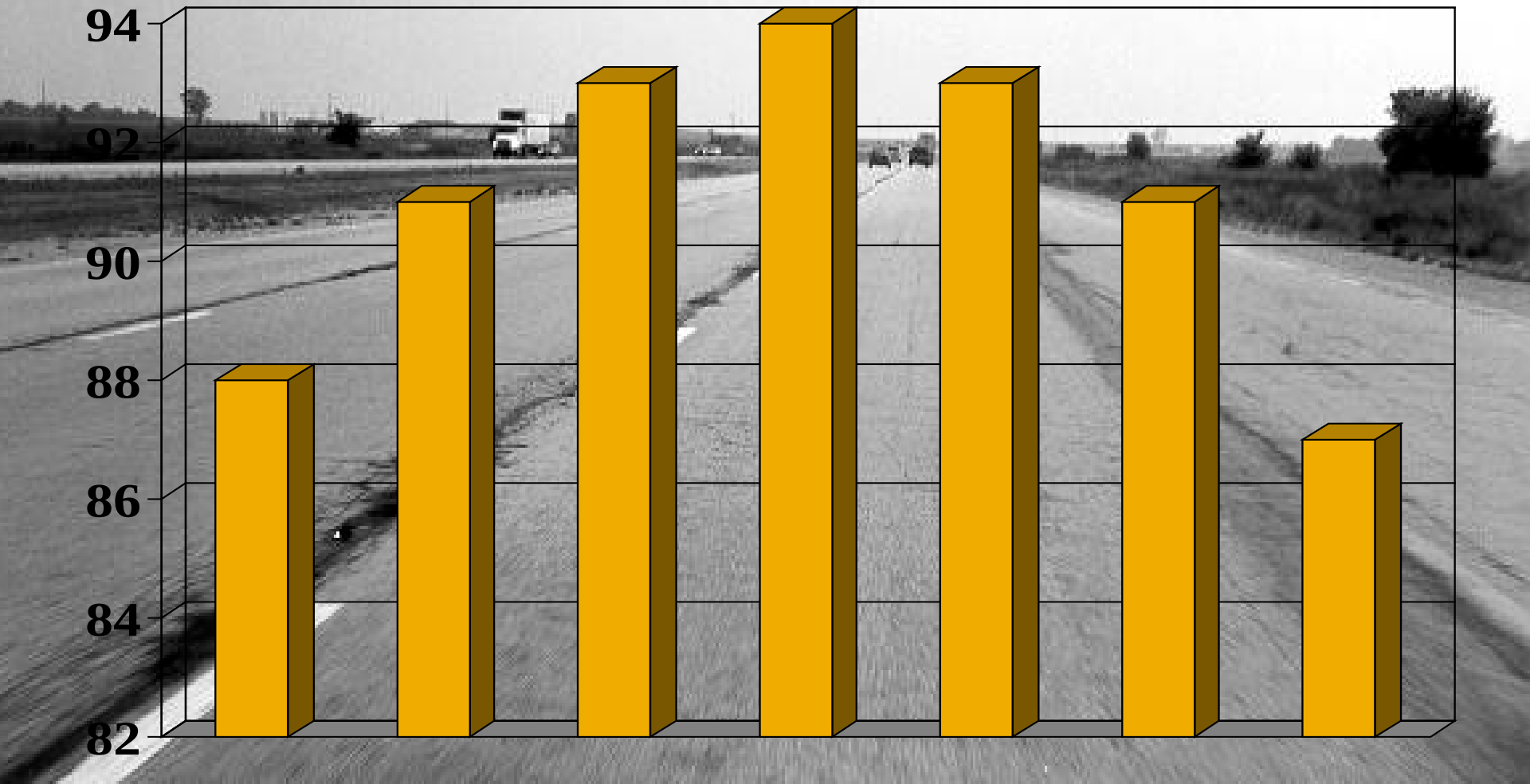

RPM
CAR COMPANY
SPEED
LIMIT
40


fex

Answer

1. What is the leading HMA distress driving pavement rehabilitation?
   a. Loss of Friction
   b. Wheel Path Rutting
   c. Raveling
   d. Premature Cracking
   e. Raveling & Cracking at the Centerline Joint

Why the Poor Performance?




How many years?

How many years?

Maintenance - Disruptive and Dangerous

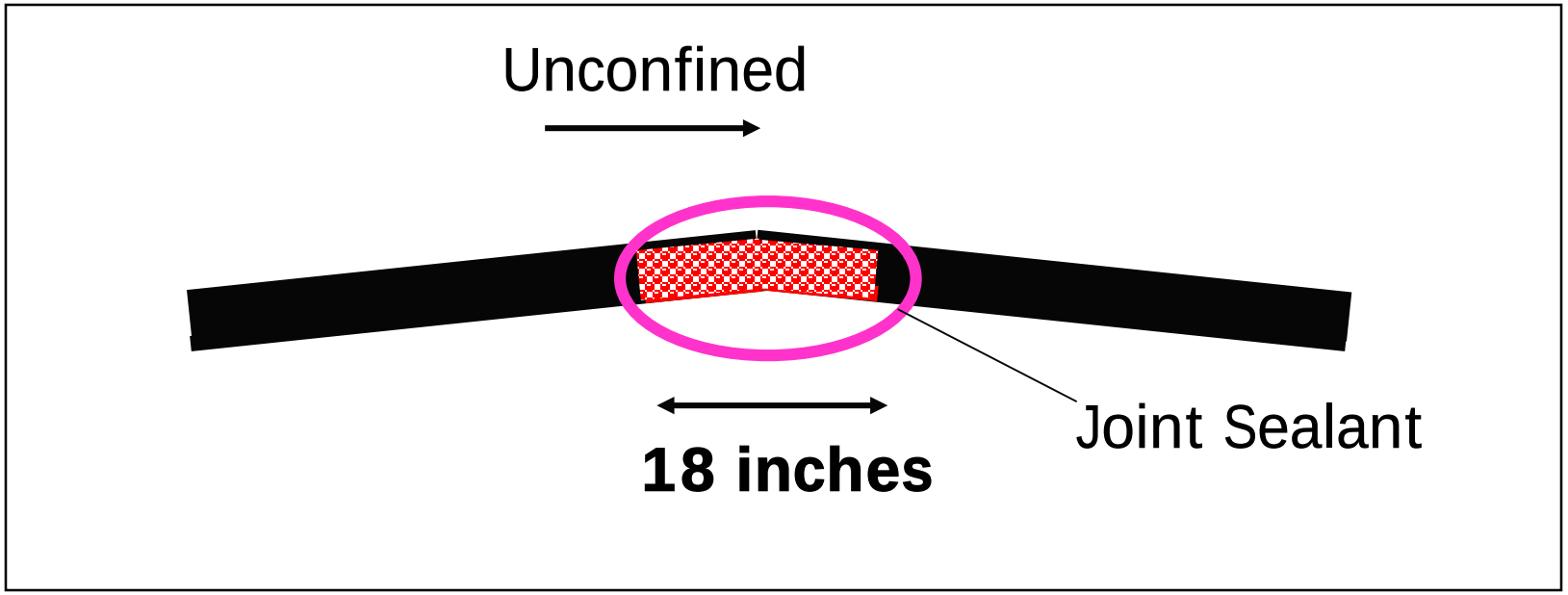
Next Step in HMA Improvement

Efforts to Minimize Permeability along Longitudinal Joints

- 2001/2002 Longitudinal Joint Sealants
  - IDOT worked w/ 2 companies to Develop a Longitudinal Joint Sealant (LJS)
  - LJS is a Band of Asphalt Binder that Seals a lift of HMA from the Bottom Up.
  - Here is How it Works:

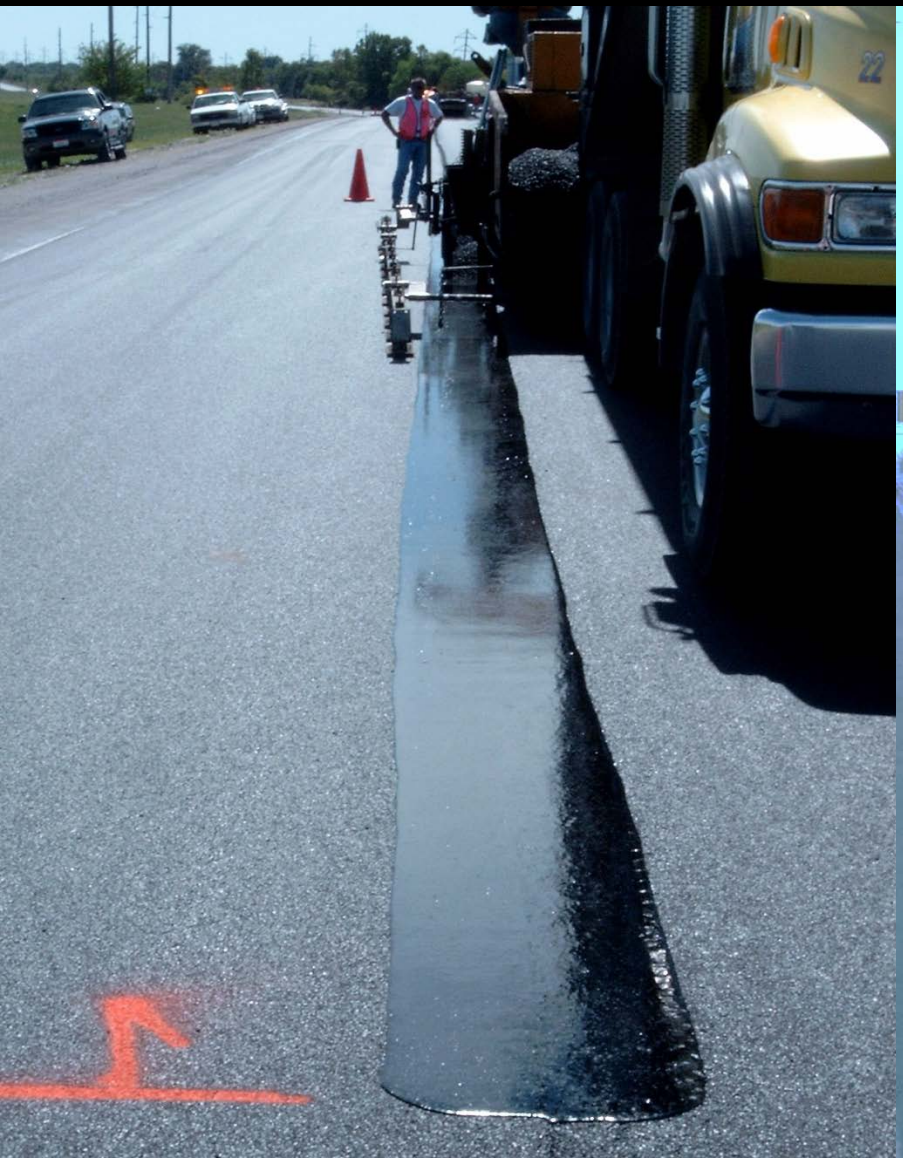
Joint Sealant Concept

- Band melts up into the joint thus:
  - Increasing density
  - Decreasing permeability
  - Increasing joint life



Asphalt Materials/Hendy Quickseam

Longitudinal Joint Seal

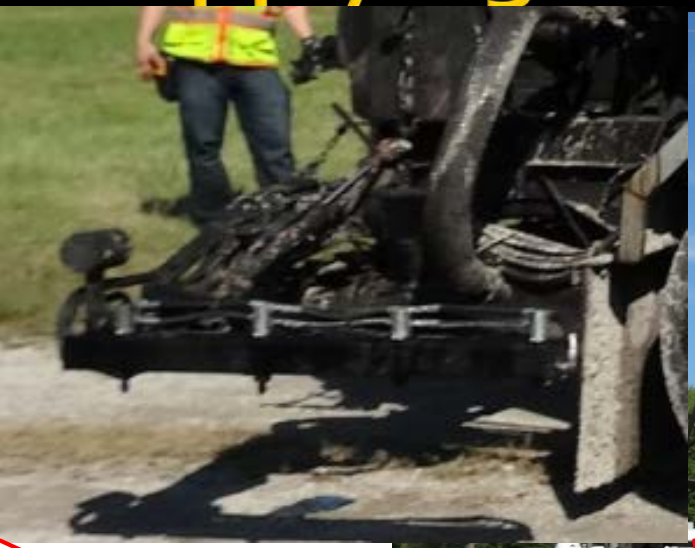


Longitudinal Joint Seal 12 Yrs Later

Longitudinal Joint Seal 12 Yrs Later


Shear Tears

Heavy Duty Pressure Distributor for Applying LJS



Heavy Duty Pressure Distributor for Applying LJS

Five Minutes After Placement

Paving over LJS

Licensed Subcontractor ≈ 11 Trucks

Cost Comparison

- Inlay: $8.00 / lineal ft
  - Includes: traffic control, mobilization, milling, priming, paving, pavement marking

Cost Comparison

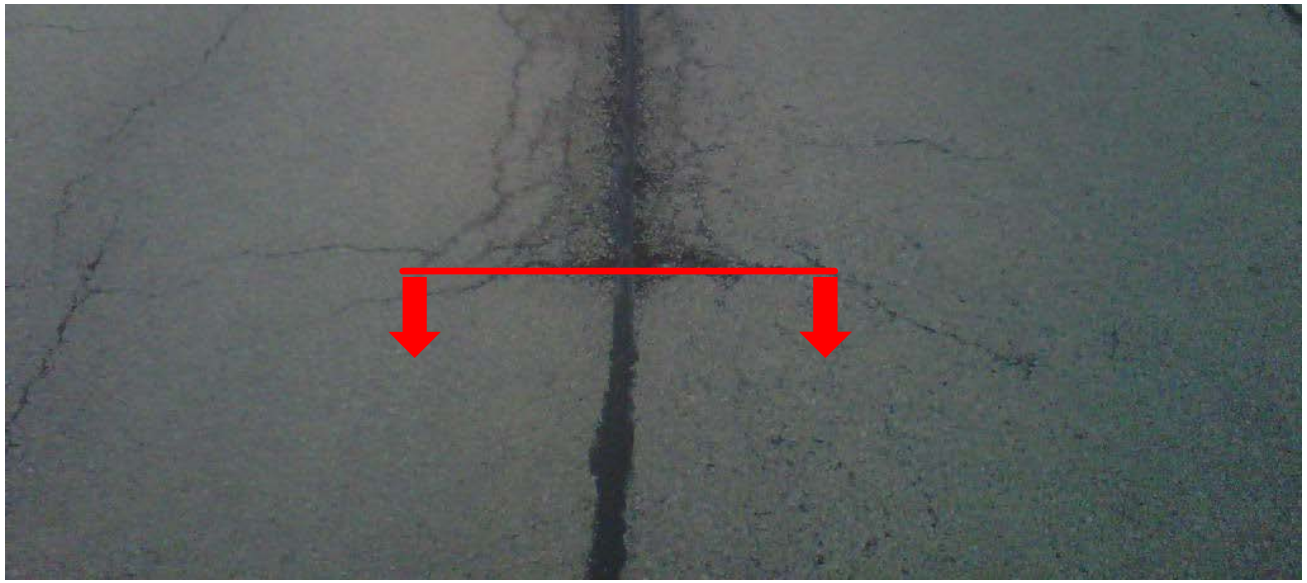
- Microsurfacing: $4.81 / lineal ft
  - Includes: crack seal, traffic control, pavement marking/removal

Cost Comparison

- Route and Seal: $2.00 / lineal ft
  - Includes: crack seal, traffic control

Cost Comparison

- Longitudinal Joint Seal: $2.00 lineal ft



Also Works as a Tack Coat

Longitudinal Joint Spec

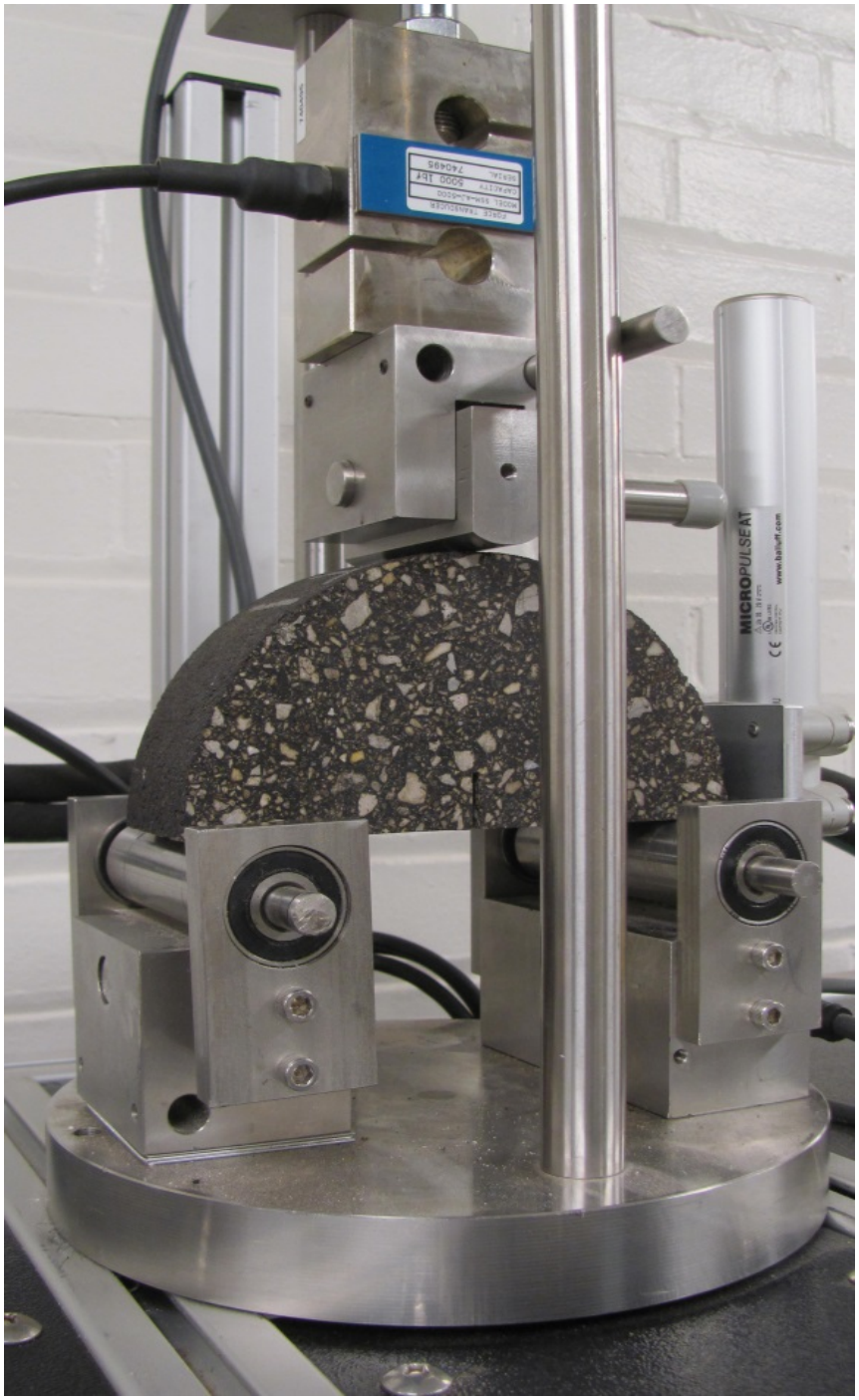
- Implementation Goals:
  - 2016 – 2 Projects per District
  - 2017 – 50% of Projects per District
  - 2018 – Full Implementation

Next Step in HMA Improvement

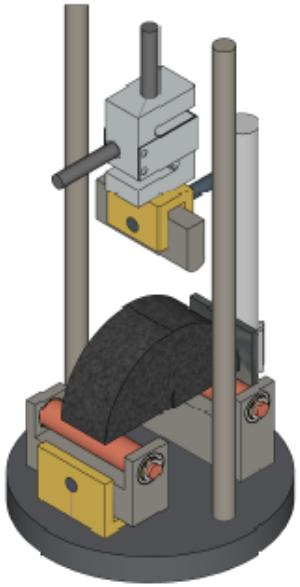
Next Step in HMA Improvement

Illinois Flexibility Index Test I-FIT

- A Performance Test Just Like Hamburg Wheel
- Uses a Semi-Circular Bend (SCB) Test Fixture with a Gyratory or Core Specimen
- The Test Can Be Completed in a Day
- Owners Can Use the Results for QA
- Contractors Can Use the Results for Optimizing Profit and Trouble Shooting
- Material Suppliers Can Use the Results for Marketing Products/Modifiers

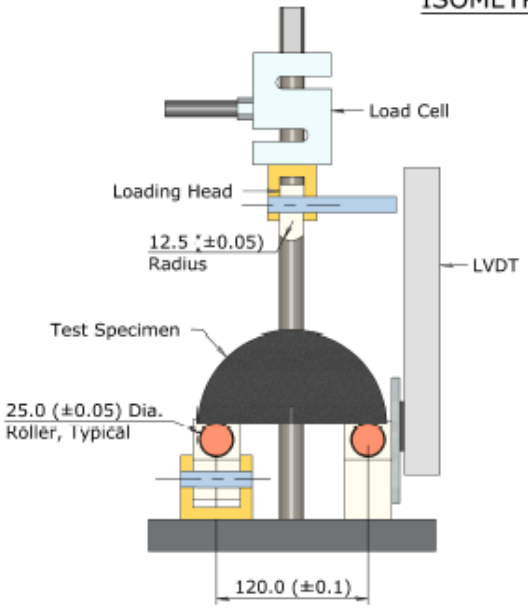


Illinois SCB set-up

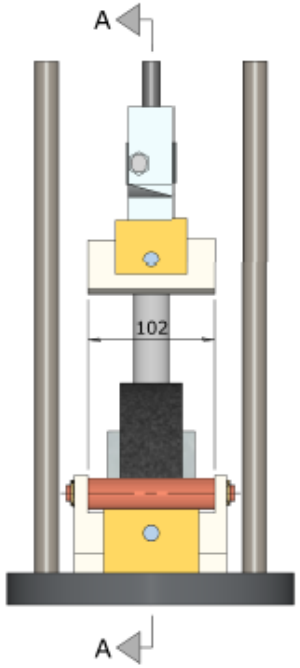


Note:
Dimensions shown are
in millimeters.

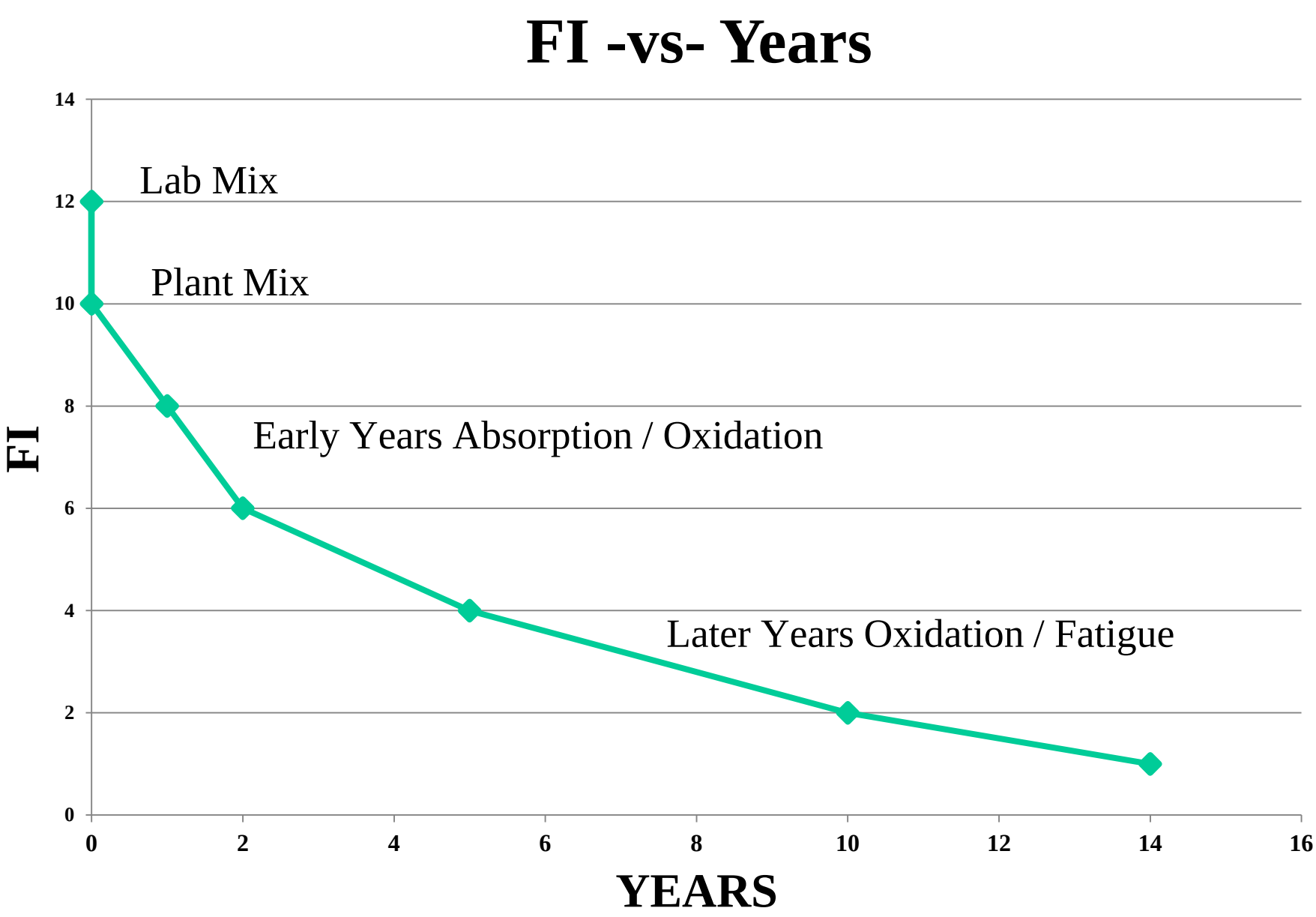
ISOMETRIC VIEW



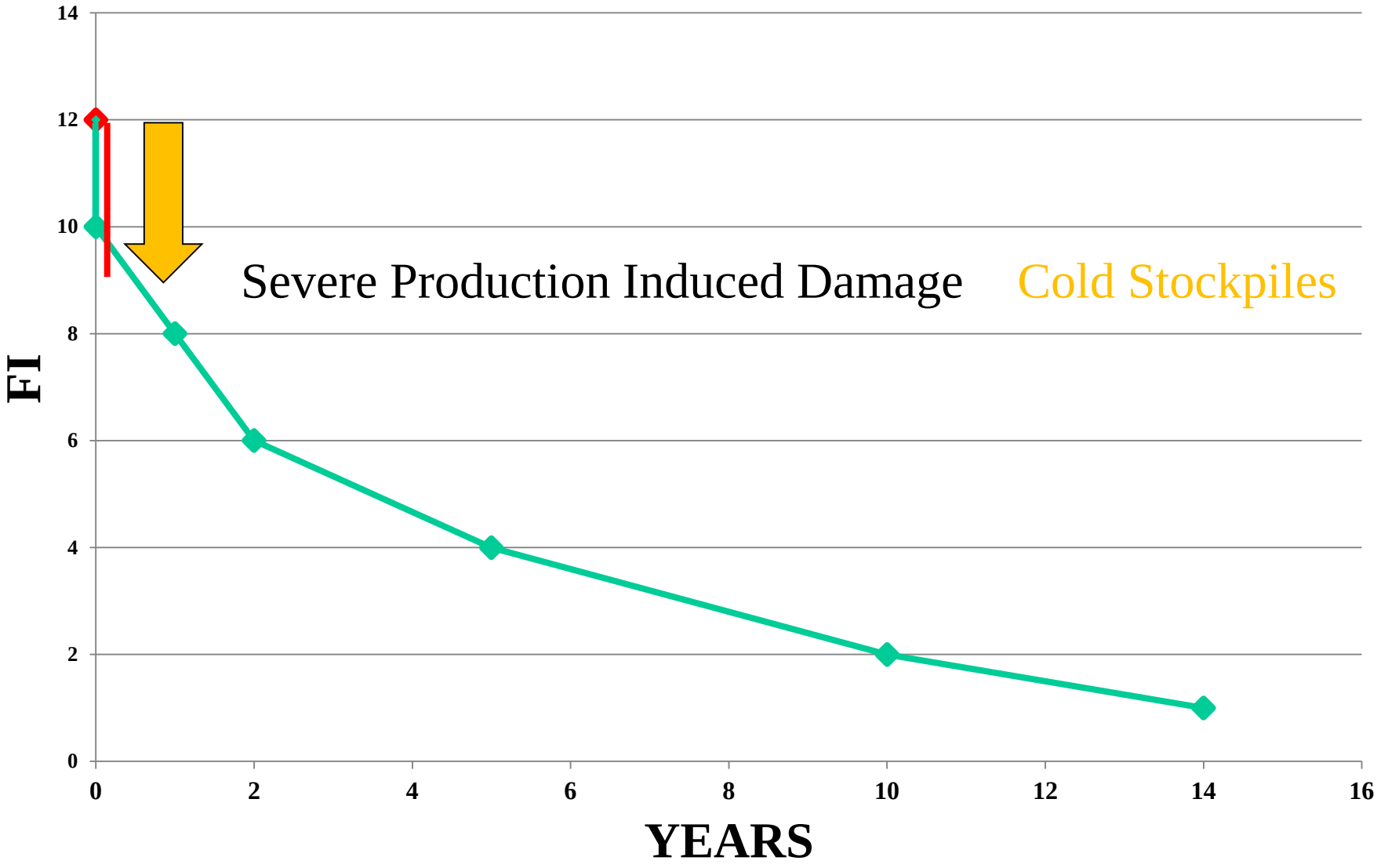
SECTION A-A



ELEVATION


FI -vs- Years
14
12
10
8
6
4
2
0
FI
Lab Mix
Plant Mix
Early Years Absorption / Oxidation
Later Years Oxidation / Fatigue
0
2
4
6
8
10
12
14
16
YEARS

FI -vs- Years


14
12
10
8
6
4
2
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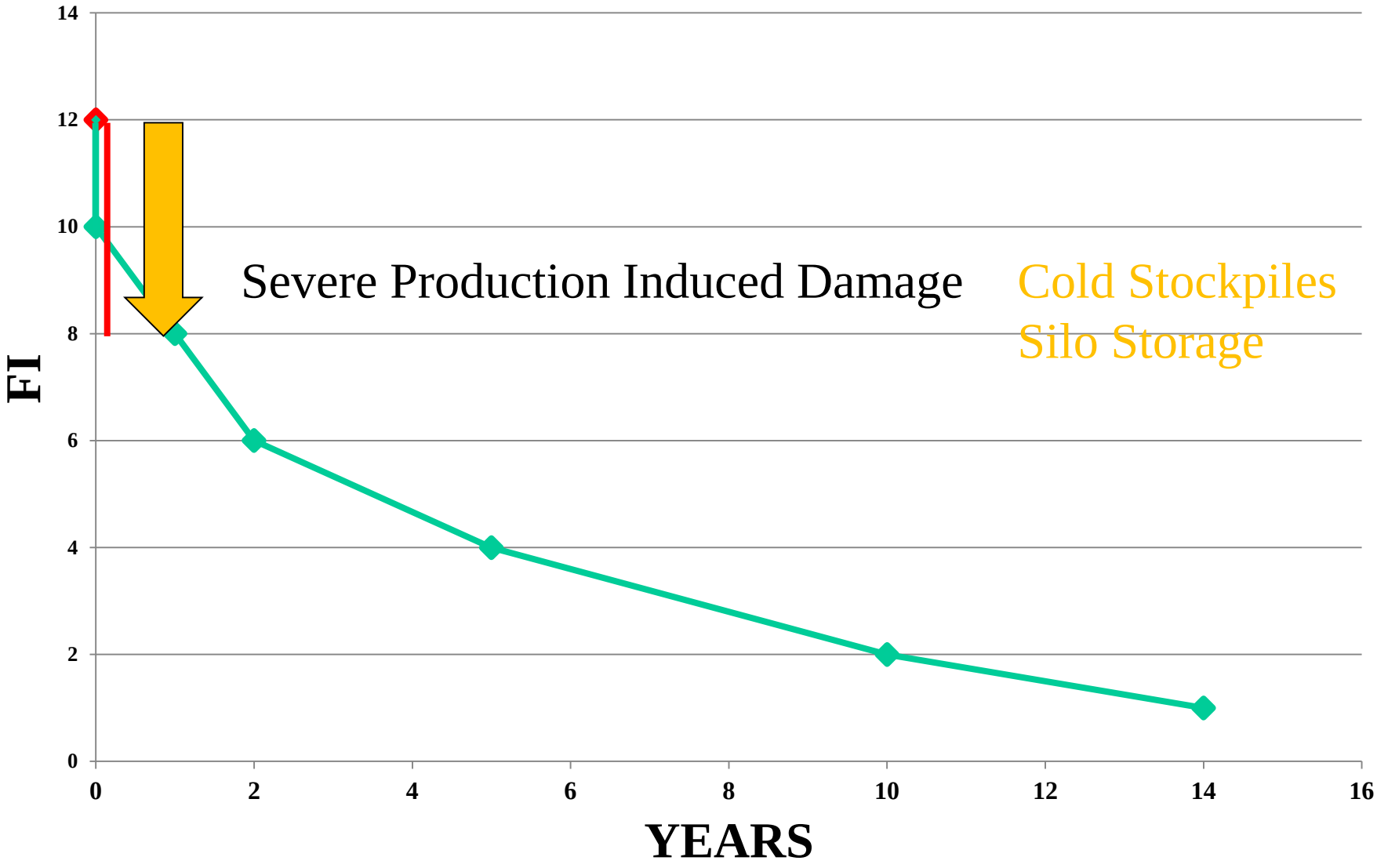
FI
0
2
4
6
8
10
12
14
16
YEARS
Severe Production Induced Damage
Cold Stockpiles

FI -vs- Years


14
12
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4
2
0
FI
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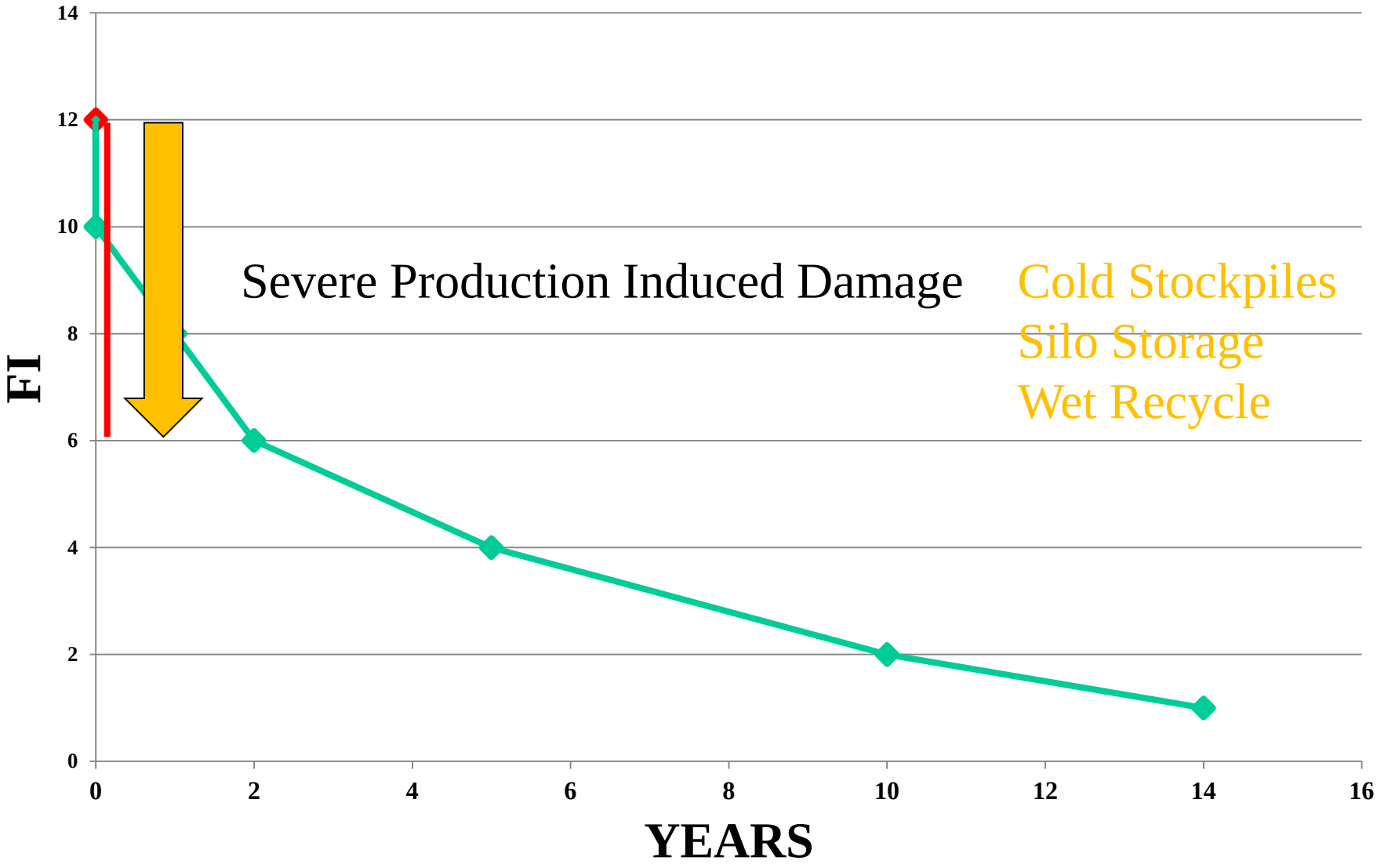
14
16
YEARS
Severe Production Induced Damage
Cold Stockpiles
Silo Storage

FI -vs- Years


14
12
10
8
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4
2
0
FI
0
2
4
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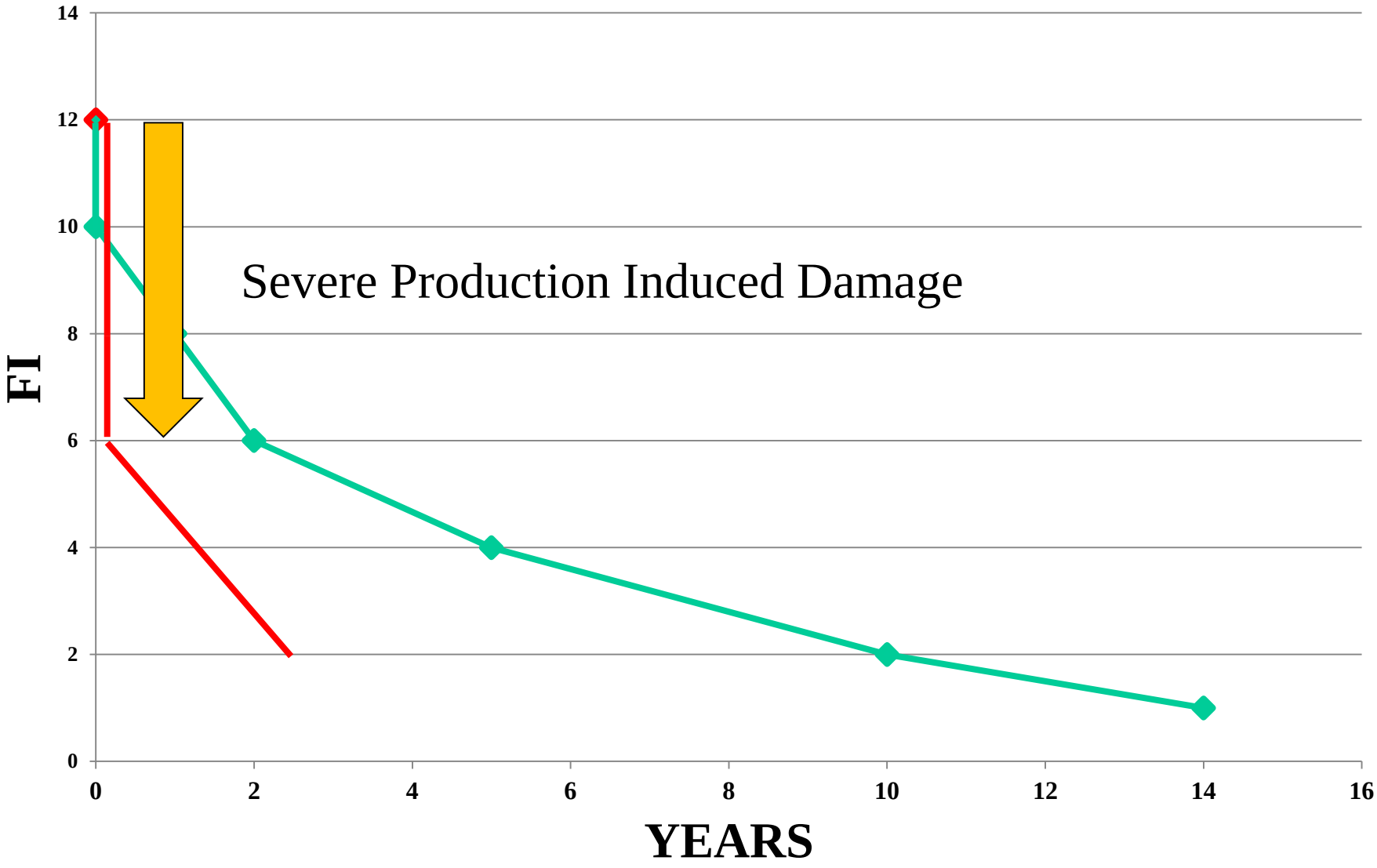
14
16
YEARS
Severe Production Induced Damage
Cold Stockpiles
Silo Storage
Wet Recycle

FI -vs- Years


14
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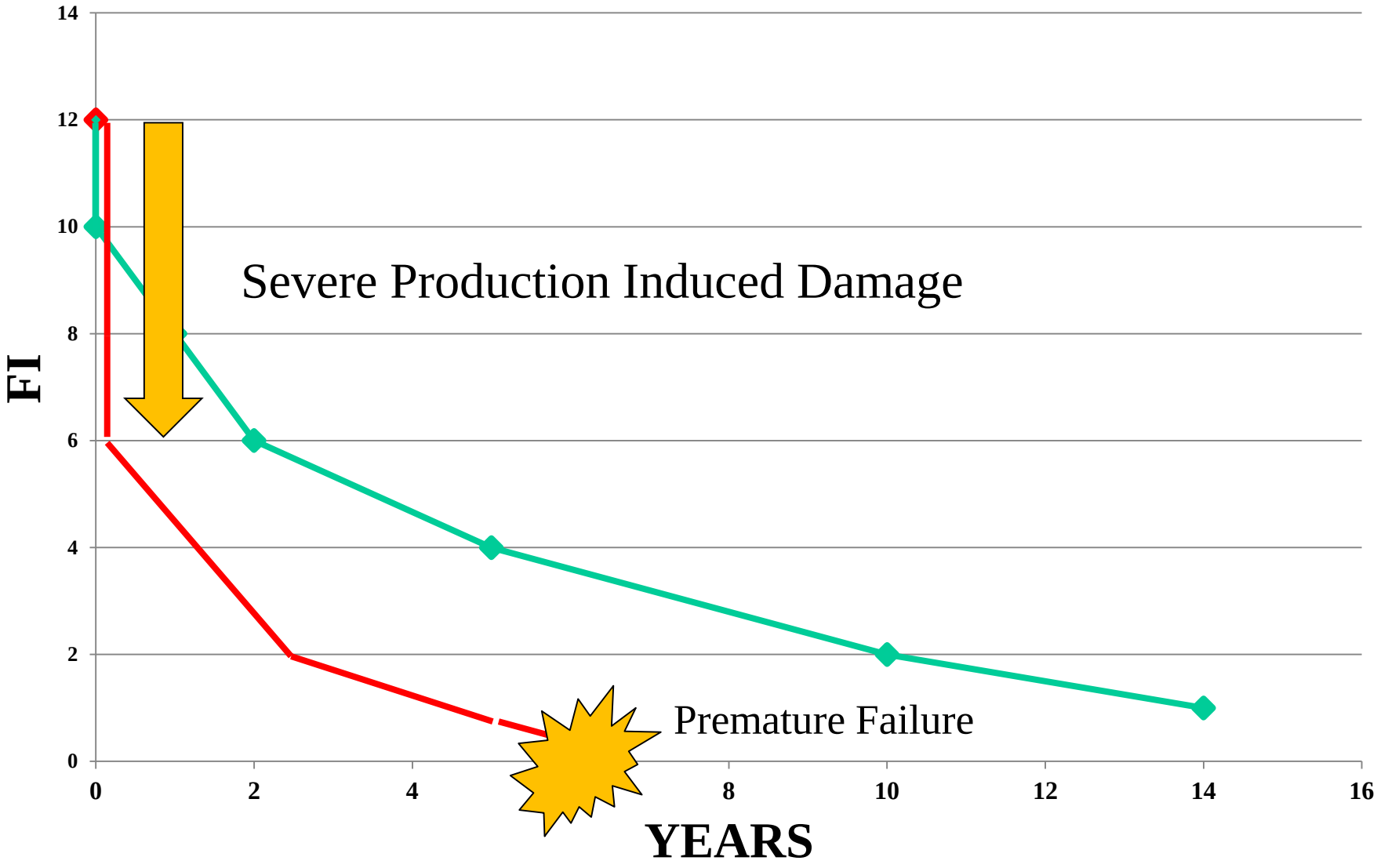
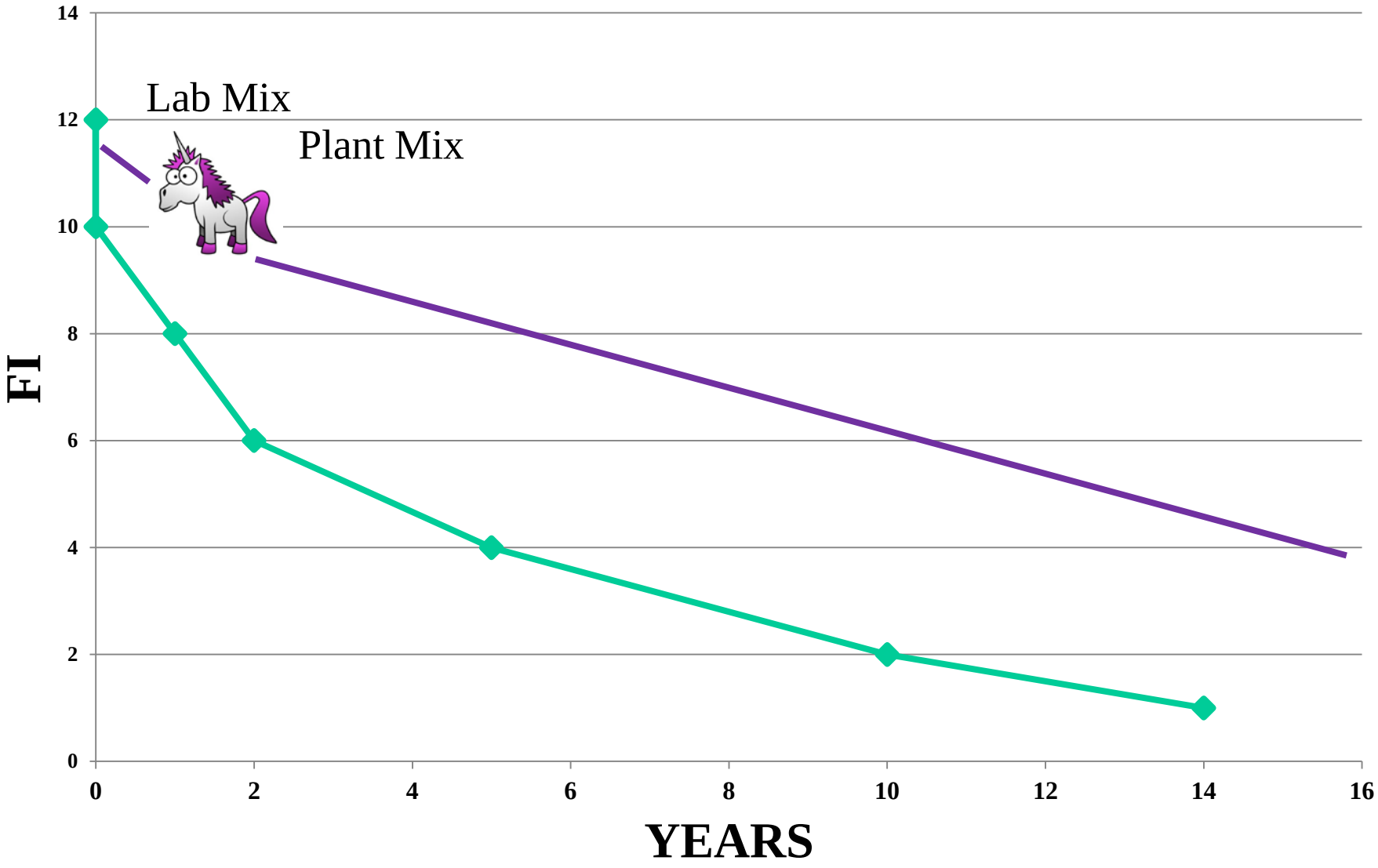
0
FI
Severe Production Induced Damage
0
2
4
6
8
10
12
14
16
YEARS

FI -vs- Years


14
12
10
8
6
4
2
0
FI
Severe Production Induced Damage
Premature Failure
0
2
4
8
10
12
14
16
YEARS

Possible Solution:
Add a Modifier to Production Mix to Minimize Damage

FI -vs- Years with Modifier



I-FIT Implementation

- The Department
  - is looking at the January and March 2016 lettings for Experimental Feature Projects
  - has On-going Round-Robin Testing with Private Labs with SCBs
  - is Testing any Contractor Plant Produced Mix Delivered for Testing
  - has Two more SCBs on Order
- Industry has Begun Testing
- Academia is Researching More Applications of the I-FIT protocol

Questions

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