



Green mining

FAM – mobile stacking bridges

30.11.2021



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Green mining / Mobile Conveyor Bridges



Wet tailing is a serious environmental problem and a big safety risk

- Wasting of water
- Danger of dam bursts
- Contamination of groundwater



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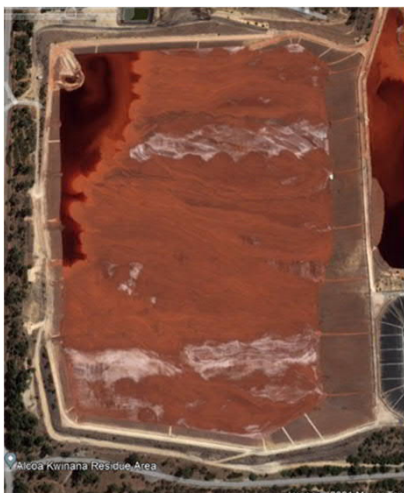
Dry tailing can solve this problem:

- Conservation of water (can be used again for industrial purpose)
- Protection of ground water
- Safer operation



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Aluminium industry a good application for changing from wet to dry tailing



Alcoa Kwinana
(Australia)

< until 2014
hudge ponds > today
dry pile >



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Stacking process:

- Discontinuous operation with trucks
- Continuous operation with radial stackers
- Continuous operation with linear stacker (mobile stacking bridges (MSB))

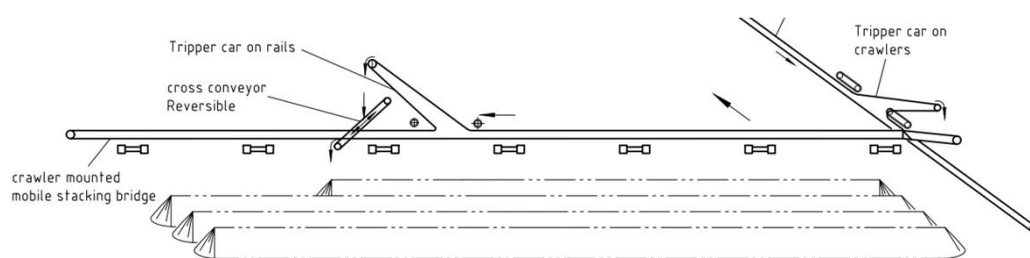
Operation modes:

- Radial
- Parallel
- Combined

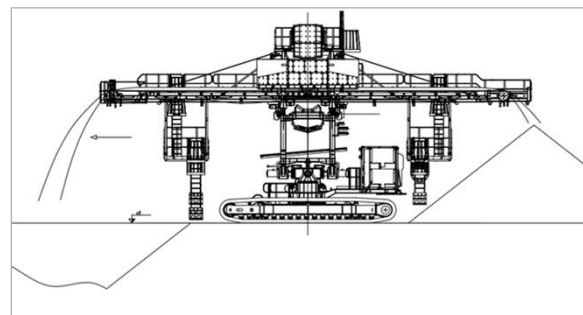


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Typical stacking system



- MSB can stack in both directions
- MSB can work in advance mode (moving on fresh stacked material!)
- MSB can work in retreat mode
- Distance of single rows can be chosen by operator (variable tripper car speed)



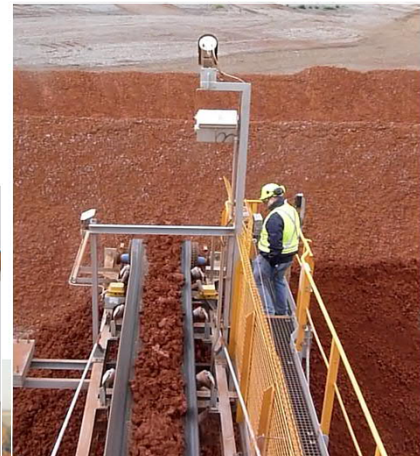
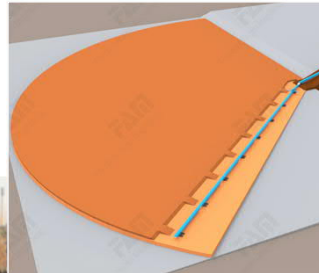
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FAM references for dry tailing

Alcoa Kwinana (Aus)

- Red mud 600 t/h
- length 365 m,
- 8 undercrriages

Radial operation



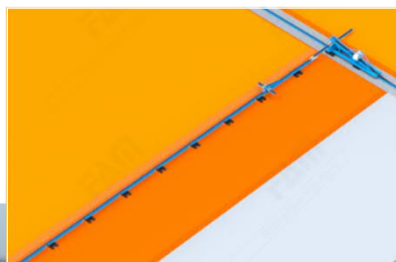
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FAM references for dry tailing

Alcoa Pinjarra (Aus)

- Red mud 1440 t/h
- length 563 m,
- 14 undercrriages

Parallel operation



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Stacking process with FAM mobile bridges

Condition of ground to consider:

- fresh stacked, still high moisture content
- less ground pressure is allowed for crawlers
- uneven surface
 - local inclinations in x,y direction / - support raising / lowering
- stacking area might be not 100% rectangular or circular formed



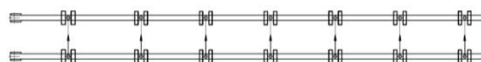
Features of FAM bridges to cover this:

- large double crawlers allows ground pressure down to 4 t/m³ only
- bridge system is statically determined and can compensate:
 - uneven surface, temperature deviations (means also length deviations)
- high flexibility of mobile bridge. It can move:
 - laterally, diagonal in all directions, even longitudinally
- stable belt run, because no vertical hinges, bridge is always:
 - straight
 - well levelled (lateral absolutely horizontal)

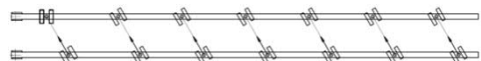
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High flexibility of FAM-bridges

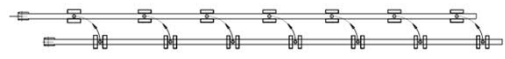
Lateral move



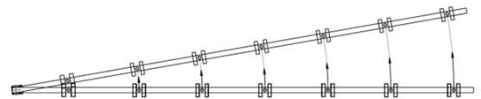
Diagonal move



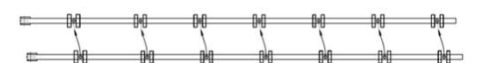
Longitudinal move



Big turn around any center inside or outside of bridge

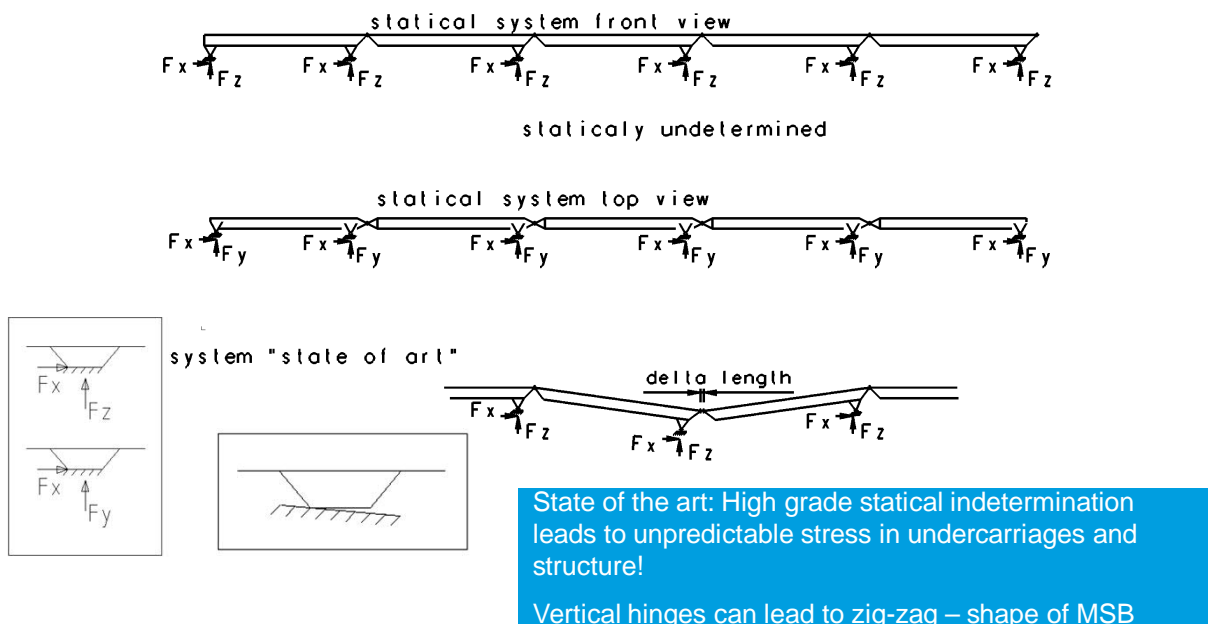


Easy correction of position

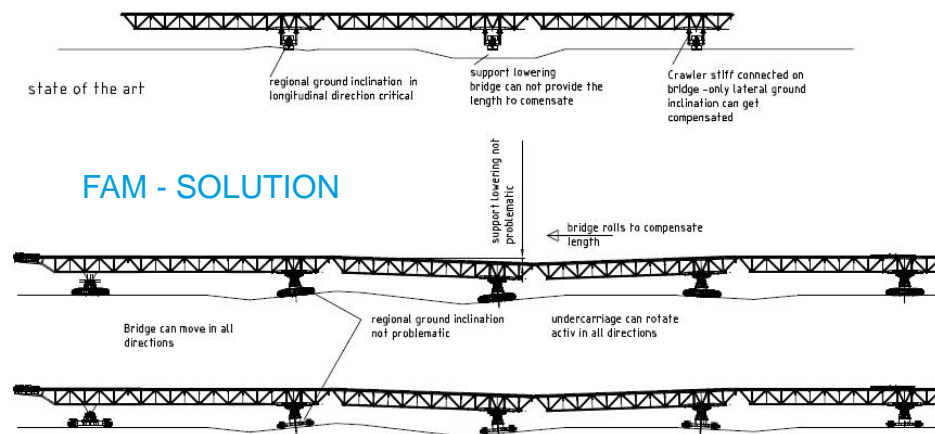


Shop test with shorten segments
Longitudinal move

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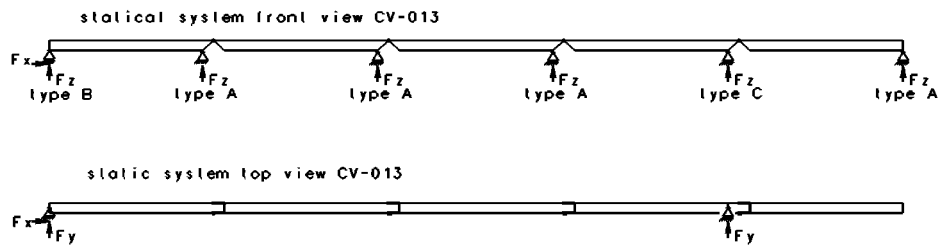
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FAM MSB solves this problem. It is statically determined.

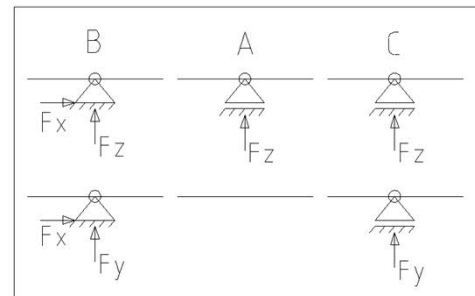
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High flexibility of FAM-bridges



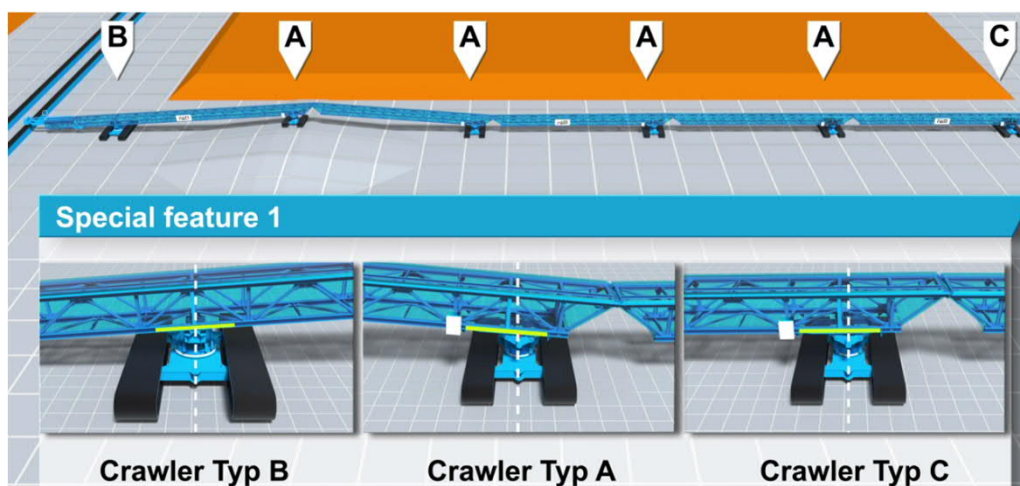
FAM Statical system

- Hinges between segments only in y – direction. MSB is always straight
- One master undercarriage B (F_x , F_y , F_z)
- One undercarriage C (F_y , F_z)
- One ore more undercarriages A (F_z)



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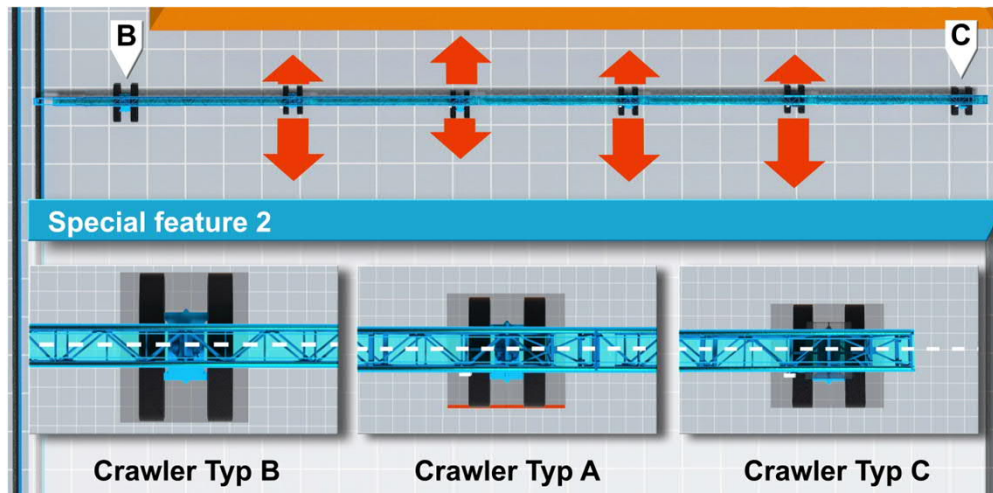
High flexibility of FAM-bridges



Support raising and lowering as well as local ground inclinations can get compensated by roller tables and cardanic hinges

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High flexibility of FAM-bridges



B and C define the position of MSB. A's are flexible in x and y direction

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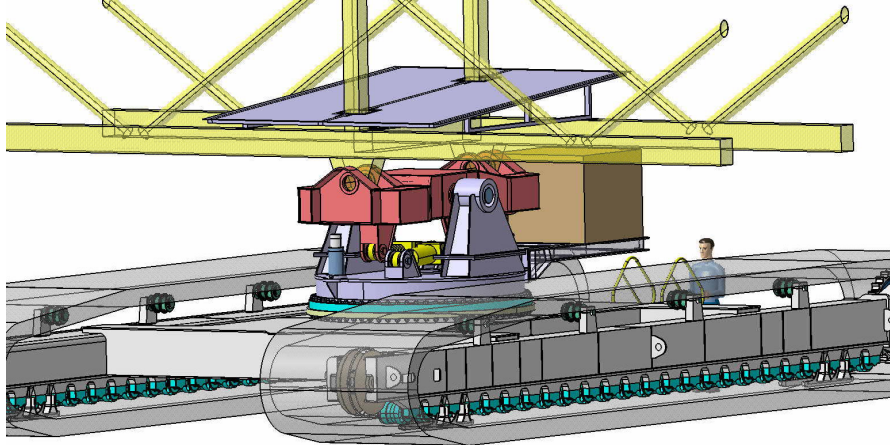
High flexibility of FAM-bridges



MSB moves uphill. Structure is always horizontal in lateral direction due to hydraulic levelling device

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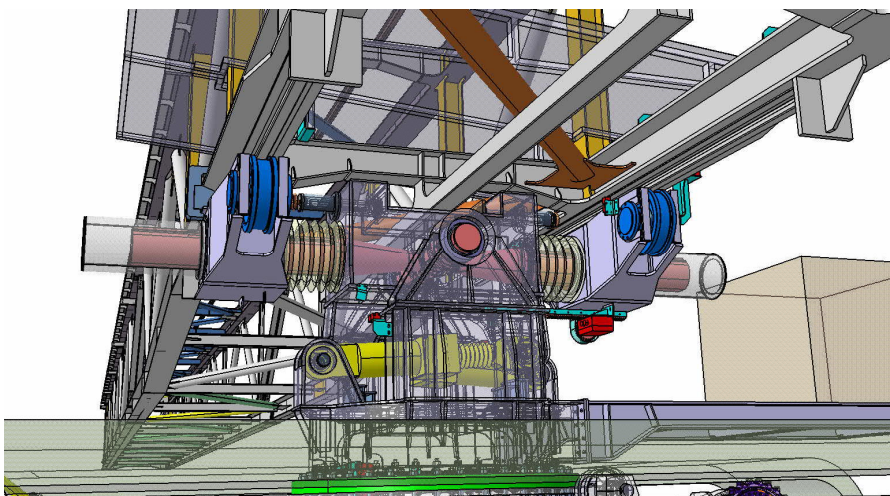
High flexibility of FAM-bridges - Undercarriage B



Undercarriage B: bearing reactions: F_x, F_y, F_z / M_x, M_y, M_z are free

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High flexibility of FAM-bridges - Undercarriage A



Undercarriage A: bearing reactions: F_z / M_x, M_y, M_z, F_x, F_y are free

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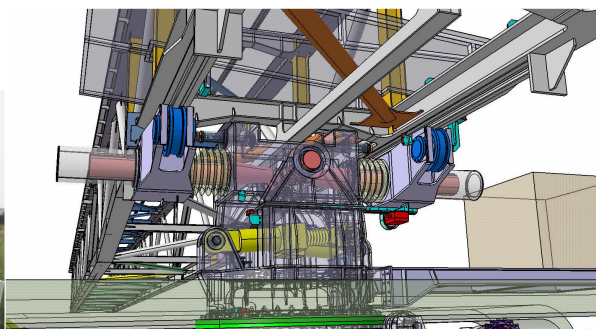
High flexibility of FAM-bridges - Undercarriage A



Undercarriage A: bearing reactions: F_z / M_x , M_y , M_z , F_x , F_y are free

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High flexibility of FAM-bridges - Undercarriage C



Undercarriage C:

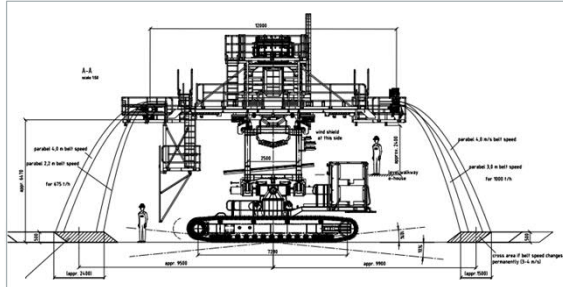
bearing reactions: F_y , F_z

M_x , M_y , M_z , F_x are free

C is a laterally blocked A

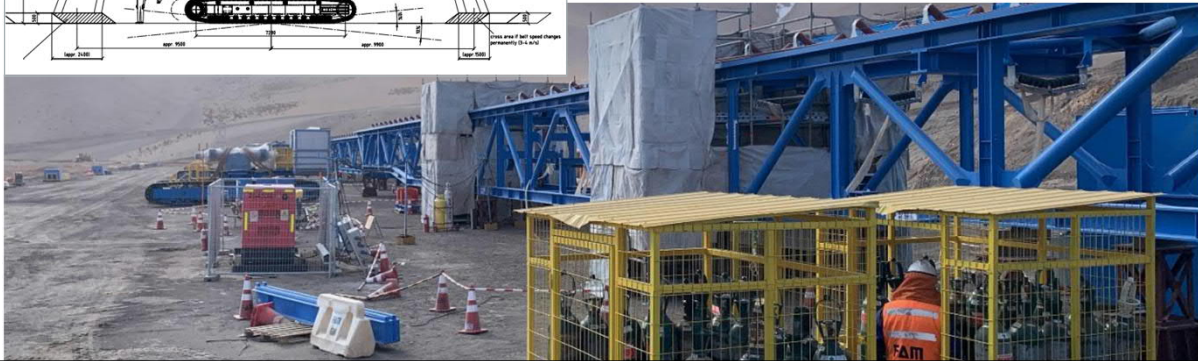
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Latest FAM references for dry tailing



Kinross (Chile) (during erection)

- Gold ore 1000 t/h
- length 500 m, 9 undercrriages



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FAM

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