JAL's New EBT Competency Assessment Methodology

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Experience

1990 ～ 1993: Cargo (NRT)

1993 ～ 2005: Dispatcher (NRT, KIX, ORD, TYO Operation Control Center)

2005 ～ 2006: Flight Safety

- SMS (Safety Management System)
- LOSA (Line Operations Safety Audit)

2006 ～ : Flight Crew Training

- Improving CRM training
- Competency Based Training Developer
  (ISD : Instructional System Design)
- JAL MPL Training Course Developer
- Non-Technical Skills Assessment
- Train the Trainer (TEM/MCC/Non-Technical Skills)
- Writer of In-House Reference Material
  (TEM, MCC, Non-Technical Skills and Assessment Guide)

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- JAL’s Journey to EBT
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JAL's Flight Crew Training and Check(～Early 2010s)

End of 1980s ～ early 2010s,

"Plateau（ Old Fashioned ）"

Repetition of Maneuvers
(Mandatory Maneuvers Item)

- ✓*Engine failure between V1 and V2*
- ✓*Rejected take-off before reaching V1*
- ✓*Non precision approach*
- ✓*Engine-out precision approach*
- ✓*Go-around engine-out*
- ✓*Landing critical engine inoperative*
- ✓*Minimum circling*

etc.

+

Unrealistic LOFT
(No CRM Skills Assessment)

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JAL's Flight Crew Training and Check(Early 2010s～)

Early 2010s ～
"Disruptive Innovation"

JAL experienced bankruptcy in 2010, but innovated flight crew training despite lack of resources.

- ***Evidence-based training（EBT）***
- ***IT（Database and Data Analysis）***
- ***Competency Based Training***
- ***Non-Technical Skills Assessment***
- ***Multi-Crew Co-operation（MCC）***

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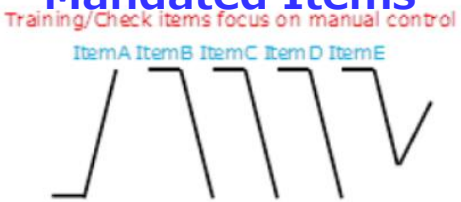
Traditional Training and Check vs. Evidence-based Training

Traditional（Regulation Oriented）

Regulatory Requirement

Training/Check Items

Repetition of Mandated Items



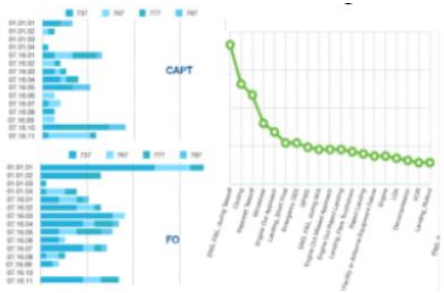
Tick Box Style Training/Check

EBT（Airline Oriented）

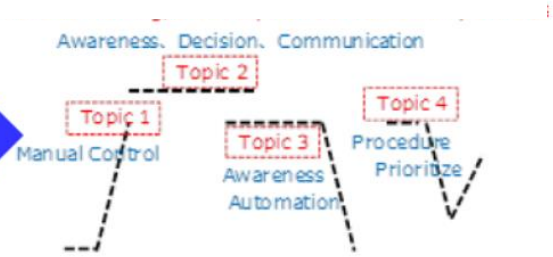
Variety of Data

- LOSA
- Accidents/Incidents studies
- Flight data analysis studies
- Training data studies
- Pilot survey
- Scientific reports
- Training criticality survey

Data Analysis



Various Scenarios and Maneuvers



Training to Enhance Competency!

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Difference of Competencies between JAL and EBT/LOSA

Competency

"A combination of **skills, knowledge**, and **attitudes** required to perform a task to prescribed standard. (ICAO Annex 1) "

JAL (10 Category)	EBT/LOSA (9 Category)
• Aircraft Flight Path Management, Auto	• Aircraft Flight Path Management, Auto
• Aircraft Flight Path Management, Manual	• Aircraft Flight Path Management, Manual
• Application of Procedures	• Application of Procedures
• Situational Awareness	• Situation Awareness
• Decision Making	• Problem Solving & Decision-making
• Workload Management	• Workload Management
• Team Building	• Leadership & Teamwork
• Communication	• Communication
• Knowledge	• Knowledge
• Attitude	

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Old JAL's Competency Grading

Mandatory Training and Check Item	FA	FM	AP	SA	DM	WM	TB	CO	KK	AA
• Flight Preparation	–	–	4	3	4	3	4	4	4	4
• Engine failure between V1 and V2	–	4	4	4	4	4	4	4	4	4
• Rejected take-off before reaching V1	–	5	5	4	4	4	4	4	4	4
• Non precision approach	–	4	4	4	4	4	4	4	4	4
• Engine-out precision approach	–	3	4	4	4	4	4	4	4	4
• Go-around engine-out	–	3	4	3	4	3	4	4	4	4
• Landing critical engine inoperative	–	4	4	4	4	4	4	4	4	4
• Minimum circling	–	3	4	3	4	4	4	3	4	4
• etc.										

- **AQP stile grading** methodology
- **5 scale grading**
- Grading for **each training and check item**

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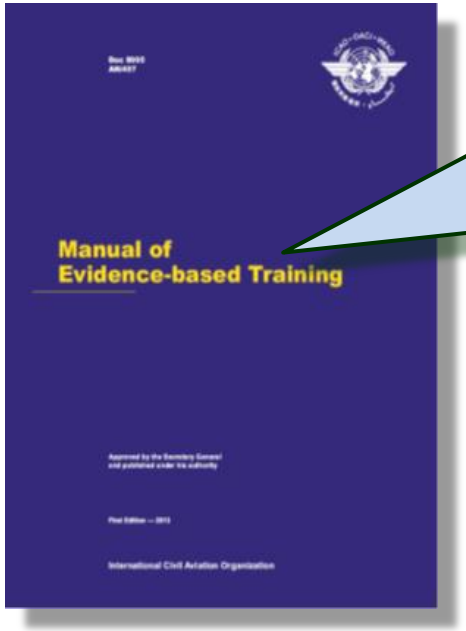
Definition of EBT

Needed to change assessment methodology upon introducing EBT.



Evidence-based training (ICAO Doc. 9995)

Training and assessment based on operational data that is characterized by developing and **assessing the overall capability** of a trainee across a range of core competencies rather than by measuring the performance in individual events or manoeuvres.

Grading for each Training/Check Items → **Assessing Overall Competency**

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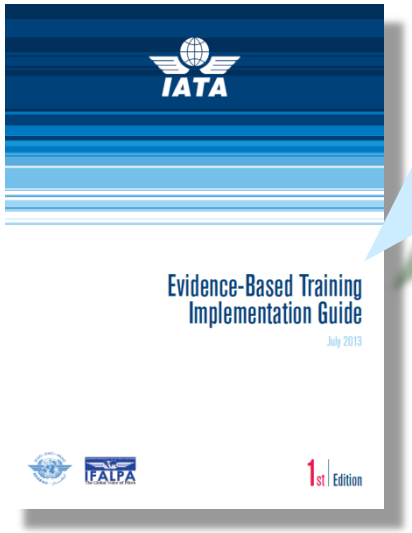
Typical EBT Competency Grading

After FFS Session, 5 Scale Overall Competency Grading



Core Competencies	Grade
☐ *Application of Procedures（APK）*	4
☐ *Communication（COM）*	4
☐ *Flight Path Management, Automation（FPA）*	3
☐ *Flight Path Management, Manual（FPM）*	3
☐ *Knowledge（KNO）*	4
☐ *Leadership & Teamwork（LTW）*	4
☐ *Problem Solving & Decision-making（PSD）*	3
☐ *Situation Awareness（SAW）*	3
☐ *Workload Management（WLM）*	4

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Lesson Learned from Former 5 Scale Grading

- ✓ *Convey an Image of Scoring and Ranking*
  - ⇨ ***Both trainees and instructors felt resistance.***
- ✓ *Grading can be Up/Down by the Other Flight Crew*
  - ⇨ ***Unfairness occurs by paired flight crew.***
- ✓ *Ineffective Feedback to the Trainees*
  - ⇨ ***Trainees can't know how to improve their performance.***
- ✓ *Complex Grading Criteria*
  - ⇨ ***Affects reliability of the data.***
- ✓ *Rare 5 (Excellent) and 2 (Bellow STD), Nil 1 (Poor)*
  - ⇨ ***Affects effectivity of the data.***

Not only useless data, but also
negative training culture …

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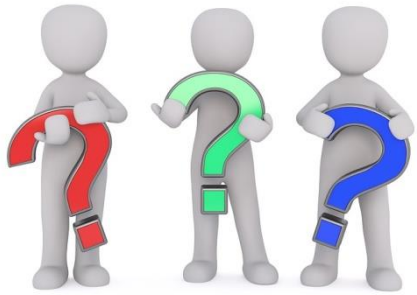
Questions about Competency Assessment

- ***Why we are using 5 grading scale?***
- ***What is purpose of the assessment?***
- ***What is the best way to assess?***



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Paradigm Shift of Competency Assessment

Casual assumption

"If there is no numeric grading …"

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Conclusion about Competency Assessment

- ***Why we are using 5 grading scale?***
  - ⇨ ***Just emulated AQP methodology, no our own thought.***
- ***What is purpose of the assessment?***
  - ⇨ ***To develop flight crew competency, not just scoring.***
- ***What is the best way to assess?***
  - ⇨ ***Emphasis on performance, enhancing and changing.***

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JAL Performance Indicators

To emphasis on performance,

JAL newly developed performance indicators（PI）

Serial	JAL Performance Indicators	Related Assessment Marker
FA1	AFDSやFMSを状況に応じ適切に使用している	FMS Input and Mode Selection
FA2	Phase of FlightやWorkloadを考慮し、適切なAutomationのレベルとモードをタイムリーに選択している	FMS Input and Mode Selection
FA3	AFDSのモードの変化を含むAutomationの状況を、効果的にモニターしている	Automation Monitoring
FA4	航空機の状態をモニターし、所望のFlight Pathからの逸脱を認知し適切な対応を取っている	Energy Management
FA5	適切なFlight Path Managementによって最適なパフォーマンスを得られるようにしている	Energy Management
FA6	Threatに対処している間も、Automationを使用して所望のFlight Pathを維持している	Energy Management
FM1	状況に応じた正確かつ円滑なマニュアル操縦により、航空機を適切にコントロールしている	Attitude Control/Planned Control
FM2	Raw DataおよびNavigation Instrument、外部の視覚情報から航空機を適切にコントロールしている	Attitude Control/Thrust Control
FM3	AFDSやFMSを状況に応じ適切に使用している	Use of Flight Guidance Systems
FM4	AFDSのモード変化を効果的にモニターしている	Use of Flight Guidance Systems
FM5	航空機の状態をモニターし、所望のFlight Pathからの逸脱を認知し適切な対応を取っている	Energy Management
FM6	適切なFlight Path Managementによって最適なパフォーマンスを得られるようにしている	Energy Management
FM7	Threatに対処している間も、マニュアル操縦により所望のFlight Pathを維持している	Energy Management
AP1	適用されるプロシージャーや法規を順守している	Adherence to Procedures/Checklist
AP2	適用されるプロシージャーや法規の記述箇所を特定している	Adherence to Procedures
AP3	適切なプロシージャーをタイムリーに実施している	Adherence to Procedures/SOP Callout/Checklist
AP4	より安全性を確保するために必要でない限りプロシージャーに従っている	Adherence to Procedures
AP5	航空機のシステムや関連する機器を正しく操作している	Adherence to Procedures
AP6	タスクが所望通りに完了したことを確認している	Adherence to Procedures
AP7	手順に従ったATC Communicationや標準的な無線用語の使用をしている	ATC Communication
AP8	データリンクの読み取りおよび返信を正確に行っている	ATC Communication
AP9	航空機のシステムの状況をモニターしている	Cross Check
AP10	行動の結果の振り返りや相互確認を入念に行っている	Cross Check
AP11	目的や本質を理解しながらプロシージャーを実施している	Purpose Oriented Execution
SA1	航空機およびそのシステムの状況をモニターし、的確に認識している	Aircraft Awareness
SA2	航空機のエネルギーおよび予想されるFlight Pathを的確に認識している	Aircraft Awareness
SA3	客室乗務員およびお客さまの状況を認識している	Aircraft Awareness
SA4	あらゆる状況において落ち着きを保っている	Flight Crew Awareness
SA5	Situational Awareness低下の兆候を認識し、効果的に対処している	Flight Crew Awareness
SA6	Startle（驚愕）やSurprise（驚き）になり得る事態に遭遇しても、状況を把握して対処している	Flight Crew Awareness
SA7	自分自身を含む運航乗務員の状況や言動を常に把握している	Flight Crew Awareness
SA8	運航に影響し得る周囲の状況をモニターし見極め、正しく評価している	Environmental and Time Awareness
SA9	時間の経過やPhase of Flightに応じ、認識する対象を適切に特定している	Environmental and Time Awareness
SA10	情報の正確さを検証し、大きな誤りがないか確認している	Analyze
SA11	適切な情報源からから正確かつ妥当な情報を探し出している	Analyze
SA12	事態が悪い方向に進んでいる際に、状況および原因に関して、必要に応じて確認している	Analyze
SA13	何が起こり得えるか的確に予測し、現状よりも先行して考えている	Anticipate
SA14	潜在的なThreatに基づく不測の事態に対して検討している	Anticipate
KK4	「空港」「地形」「航路」に関する知識を適切に活用している	Airport and Enroute
KK5	航空気象に関する知識を適切に活用している	Aviation Whether
KK6	「TEM」「MCC」「Non-Technical Skills」「Human Performance」などの知識を適切に活用している	TEM, MCC and Non-Technical Skills
AA1	安全意識をもった行動を取っている	Safety Awareness
AA2	法規や規定の順守する行動を取っている	Safety Awareness
AA3	慎重かつ正確に業務を行っている	Carefulness and Accuracy
AA4	「Threat」「Error」「UAS」を認識し対処する行動を取っている	Threat and Error Management
AA5	運航乗務員が協力し、PICのもとでチームとして機能するような行動を取っている	Multi-Crew Co-operation
AA6	リソースを有効活用する行動を取っている	Resource Management
AA7	お客さまの満足を配慮した行動を取っている	Customer Satisfaction
AA8	コスト意識を持った行動を取っている	Cost Conscious
AA9	他のセクションの業務を理解し協力する行動を取っている	Relationship with Other Departments
AA10	諸外国の文化的および言語的な相違を理解し、適切に対応している	Relationship with Other Departments

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Example of Performance Indicators

Workload Management

Performance Indicators

WM1 : Manages time efficiently when carrying out tasks.

WM2 : Plans, prioritizes and schedules tasks effectively.

WM3 : Manages threats, errors and UAS effectively while performing tasks.

WM4 : Offers and gives assistance, delegates when necessary.

WM5 : Seeks and accepts assistance, when appropriate.

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Assessment Citeria

Observe **overall** flight crew performance throughought FFS session, and **select appropriate "Performance Indicators（PIs）"** based on criteria.

Criteria

Effective Performance	The performance indicators **effectively** demonstrated by flight crew regularly when required.
Neutral	Neither "Effective Performance" nor "Ineffective Performance", or no situation to demonstrate.
Ineffective Performance	The performance indicators **ineffectively** demonstrated by flight crew regularly when required.

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JAL's New Competency Assessment

Overall Competency Assessment (No Numeric Grading)

After FFS session, followed by de-briefing, relevant PI are selected.

Selected Effective PIs

- ✓ *Effectively monitors automation, including engagement and automatic mode transitions (FA3)*
- ✓ *Anticipates what could happen, plans and stays ahead of the situation (SA13)*
- ✓ *Encourages team participation and open communication (TB7)*
- ✓ *Announces deviations from normal or intended conditions (CO6)*

Selected Ineffective PIs

- ✓ *Plans, prioritizes and schedules tasks effectively (WM2)*
- ✓ *Verifies that tasks are completed to the expected outcome (AP6)*

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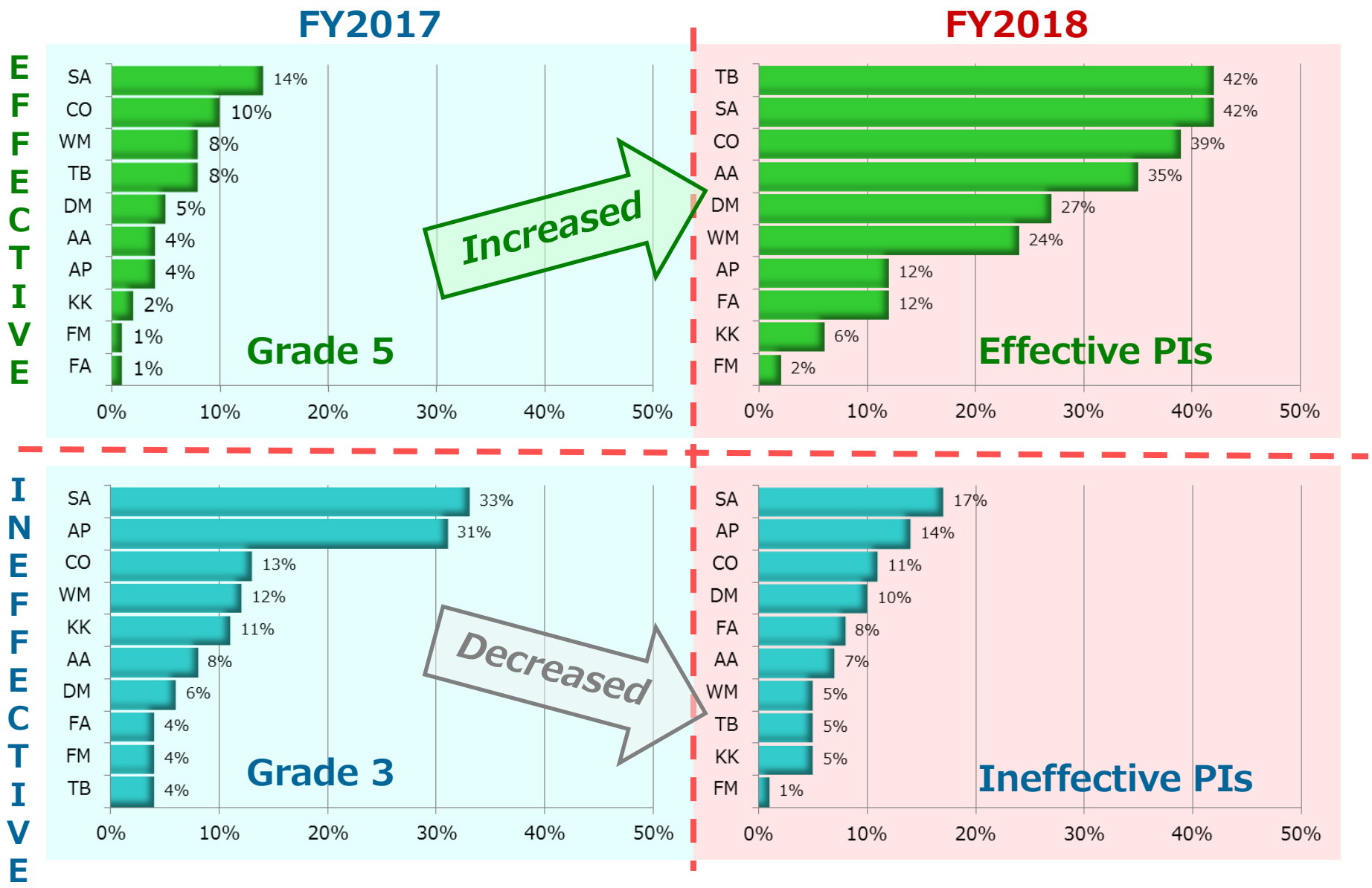
Scenario Based Training Data(Competencies)



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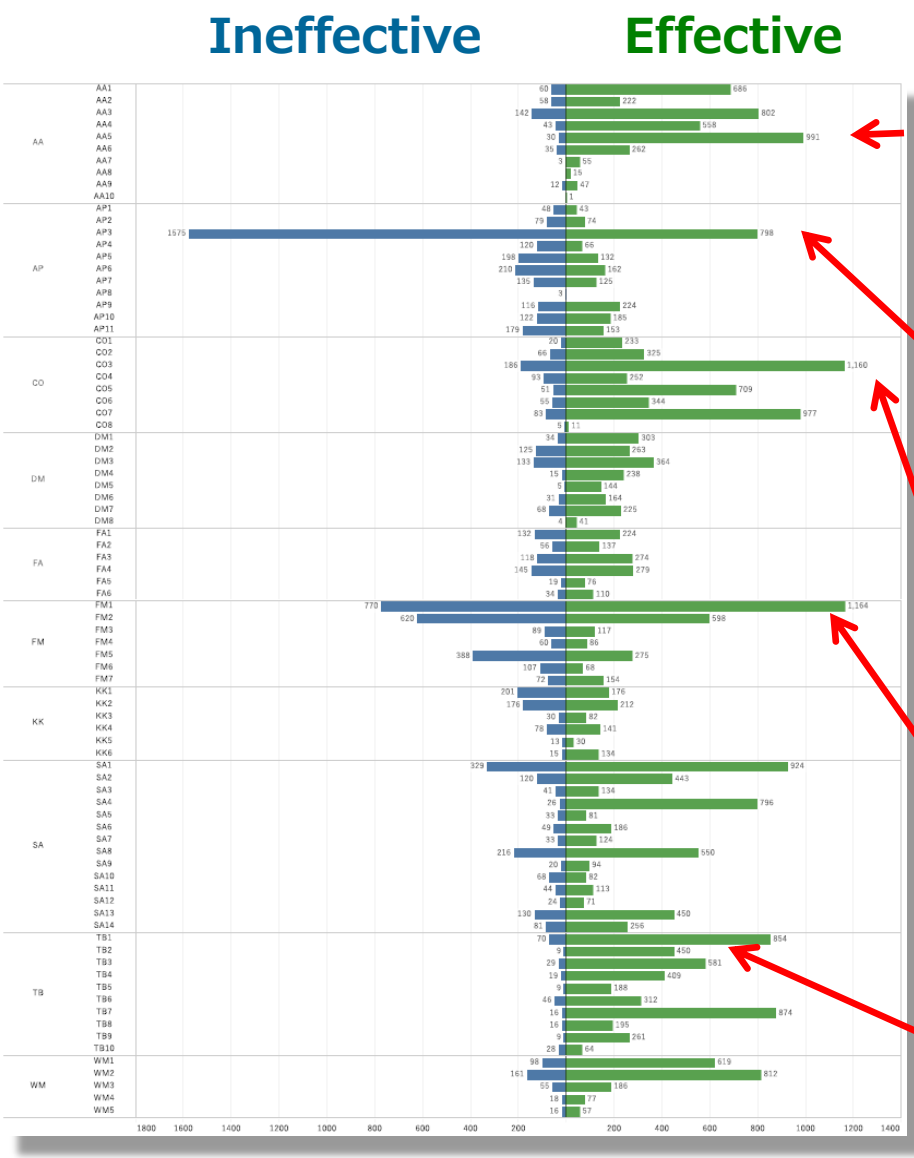
Scenario Based Training Data(Performance Indicators)



Performance Indicator（PI）

AA5 : Demonstrates proper behavior willing to co-operate by multi-crew（MCC）

AP3 : Follows relevant procedures in a timely manner

CO3 : Conveys messages clearly, accurately and concisely

FM1 : Controls the aircraft manually with accuracy and smoothness as appropriate to the situation

TB2 : Demonstrates initiative and provides direction when required

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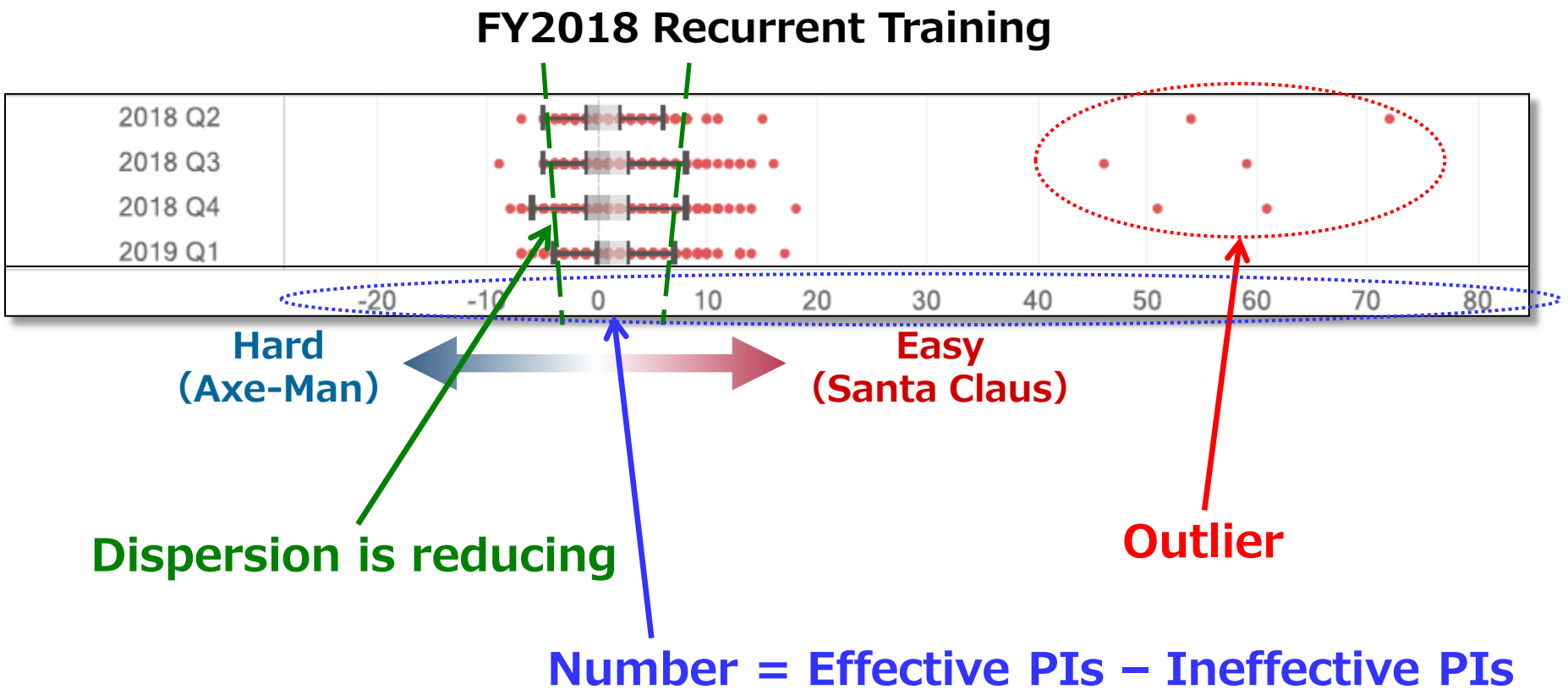
Inter Rater Reliability(IRR)



IRR can be done even if no numeric grading.

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Conclusion

By introducing JAL's new competency assessment methodology …

- ✓ ***Assessment changed to more simple.***
- ✓ ***Provide more effective feedback to flight crew.***
- ✓ ***Changed training/check culture to more positive.***

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What Place Will you Visit?

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