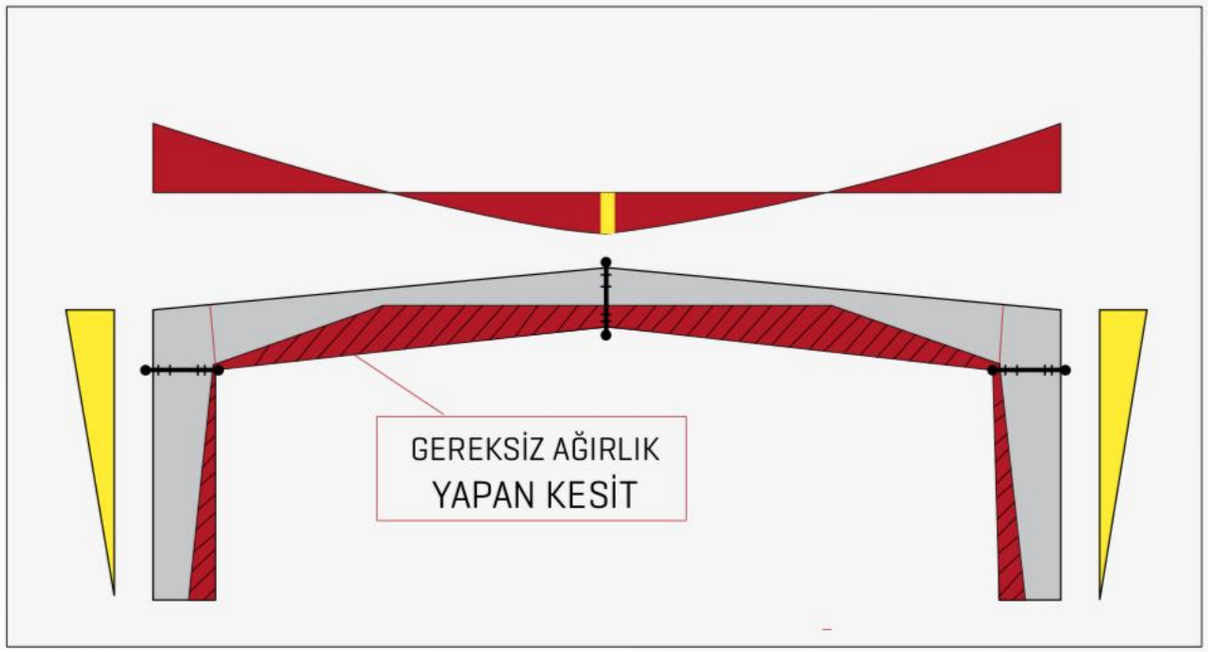
TOLAY
MÜHENDİSLİK VE İNŞAAT

PRATİK EKONOMİK BİNALAR (PEB)
PRE-ENGINEERED METAL BUILDING (PEB)

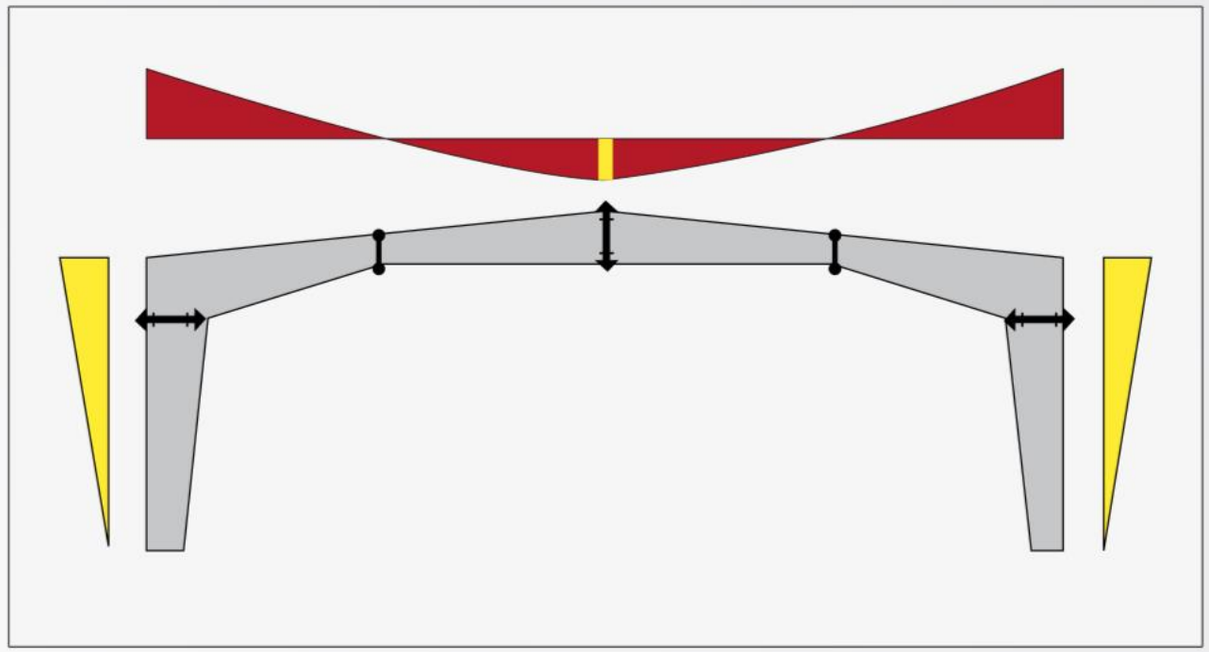
İSTANBUL - 2019

TURKISH STEEL
STEEL EXPORTERS' ASSOCIATION

Turkey
Discover
the potential



Konvansiyonel Çelik Çerçeve



Peb Çelik Çerçevesi

What is PEB?

- In today's conditions, demand for steel structures in market has increased significantly as determinants such as time, economy, storage and shelter, ease of installation and the safety of the building gained increasing significance. However, the expansion of steel buildings in international markets has been restrained because design rules of the conventional methods are not economic, design does not offer features to the structure and there is dependence on ready-made hot material elements.
- The recent developments in information technologies and engineering have brought modern solutions to improvement and building design, and as a result, a revolutionary PEB building design system has emerged.
- This revolutionary design system has made significant contributions to the fulfillment of the demand and increase in market share.

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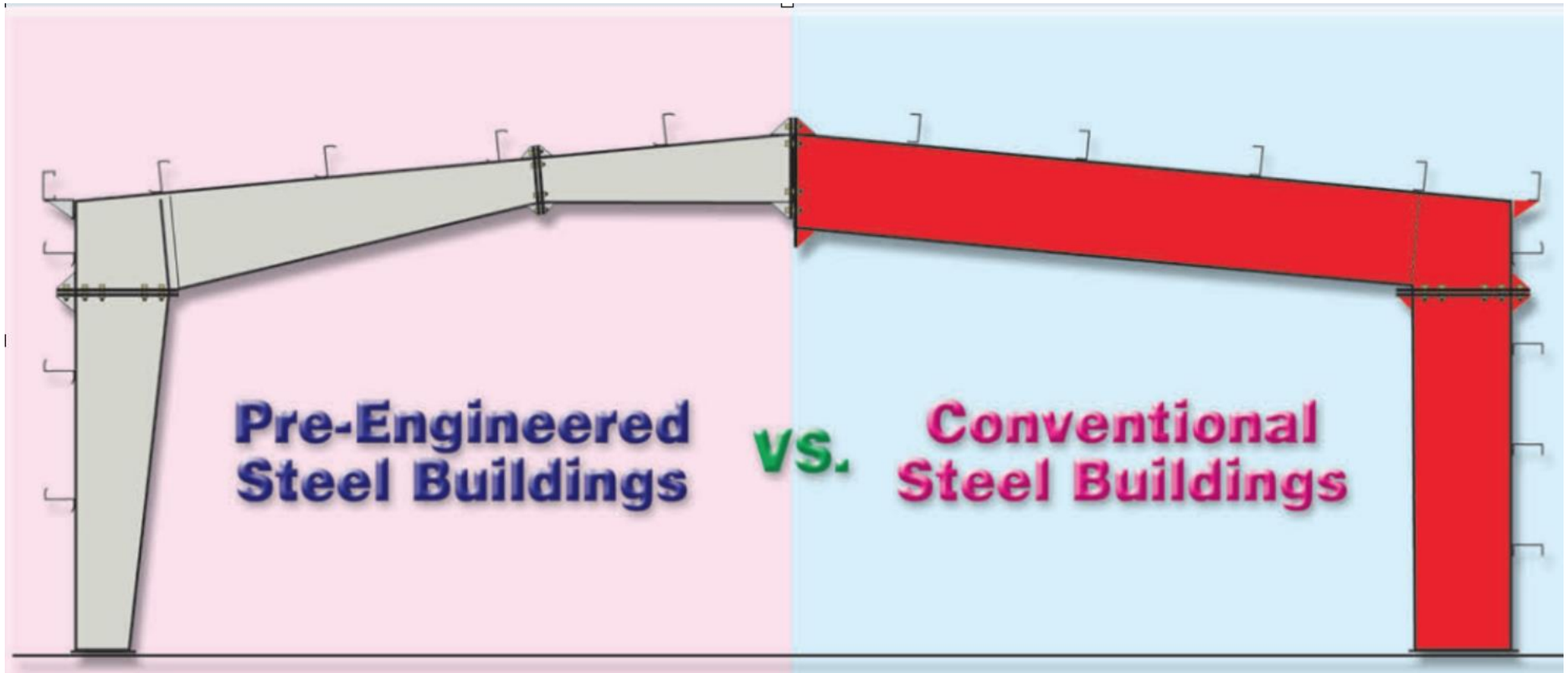

What is PEB?

- In conventional systems, although there are different stresses at each point of the frame of the forming structure, a single section is used to meet the maximum stress. This adds unnecessary weight to the structure, increases earthquake load in ratio to weight and cost and, decreases the elastic mobility of the structure.
- PEB systems have emerged to improve the disadvantages of the conventional system as mentioned above. PEB, based on the variability of stress accumulation in the system forming the structure, is a modern structure system that foresees the production of built-up section in combined sections in accordance to required capacity of the structure elements. The system reduces the weight of the structure and, with this, the structure becomes more elastic and economic and eliminates the dependency on ready profile.

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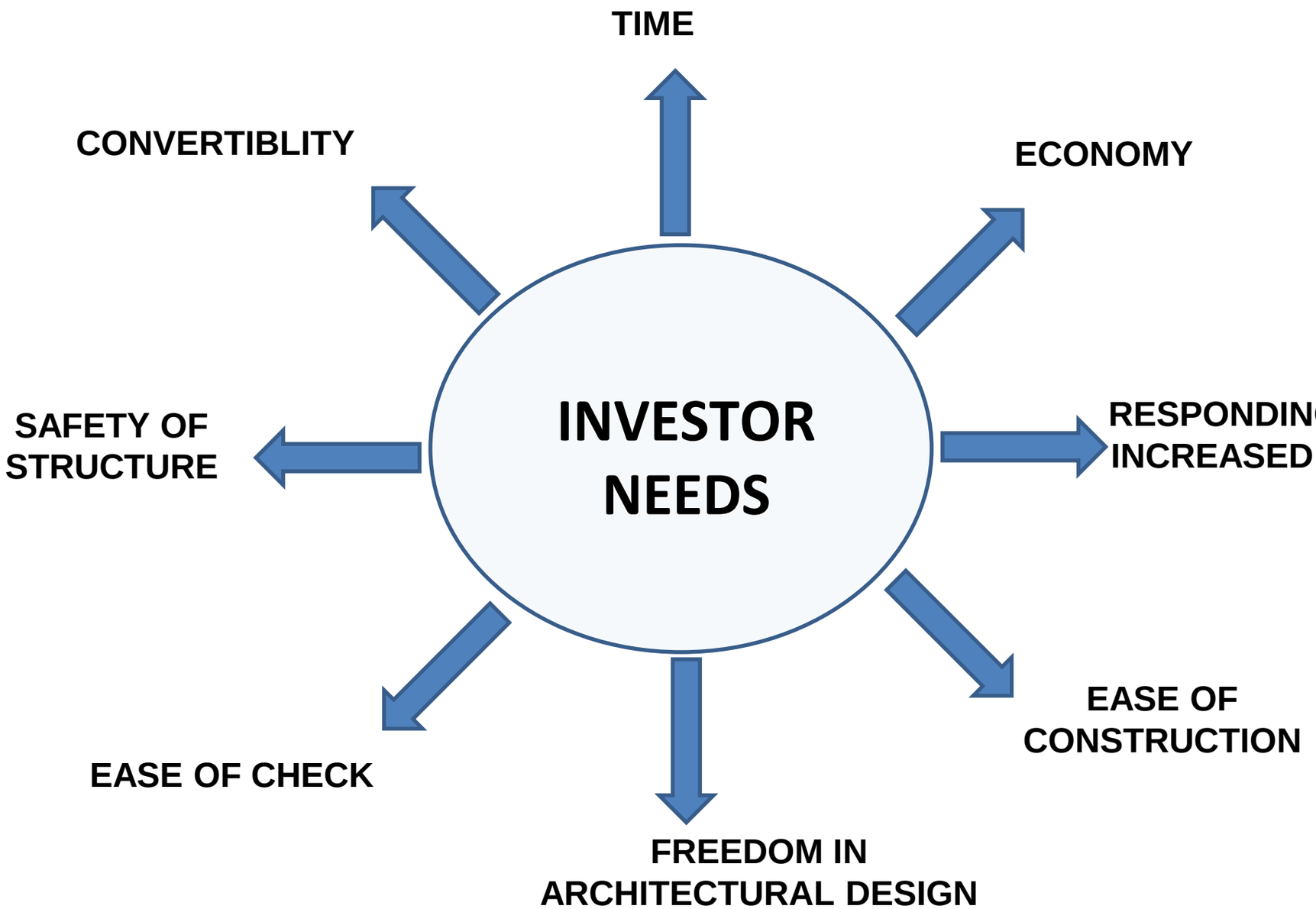
TIME
CONVERTIBLITY
ECONOMY
SAFETY OF STRUCTURE
INVESTOR NEEDS
RESPONDING TO THE INCREASED DEMAND
EASE OF CHECK
FREEDOM IN ARCHITECTURAL DESIGN
EASE OF CONSTRUCTION

STRUCTURAL SAFETY AND COMPARISON

Conventional Steel System	PEB System
Earthquake loads to the structure are increased in ratio because the structural total steel is heavy.	It is %30-%40 lighter than the conventional system, as a result earthquake loads to the structure are lesser in same ratio.
Earthquake loads to the structure are increased in ratio because the structural total steel is heavy.	Decreases the tension on ground in ratio with the lightness of the PEB systems.
Rotation effects in base design must be taken into consideration because basic joint points are rigid joints.	Rotation effects in base can be overlooked as the joint points are hinged. More economic base dimensions can be designed.
	%30-%40 less cost

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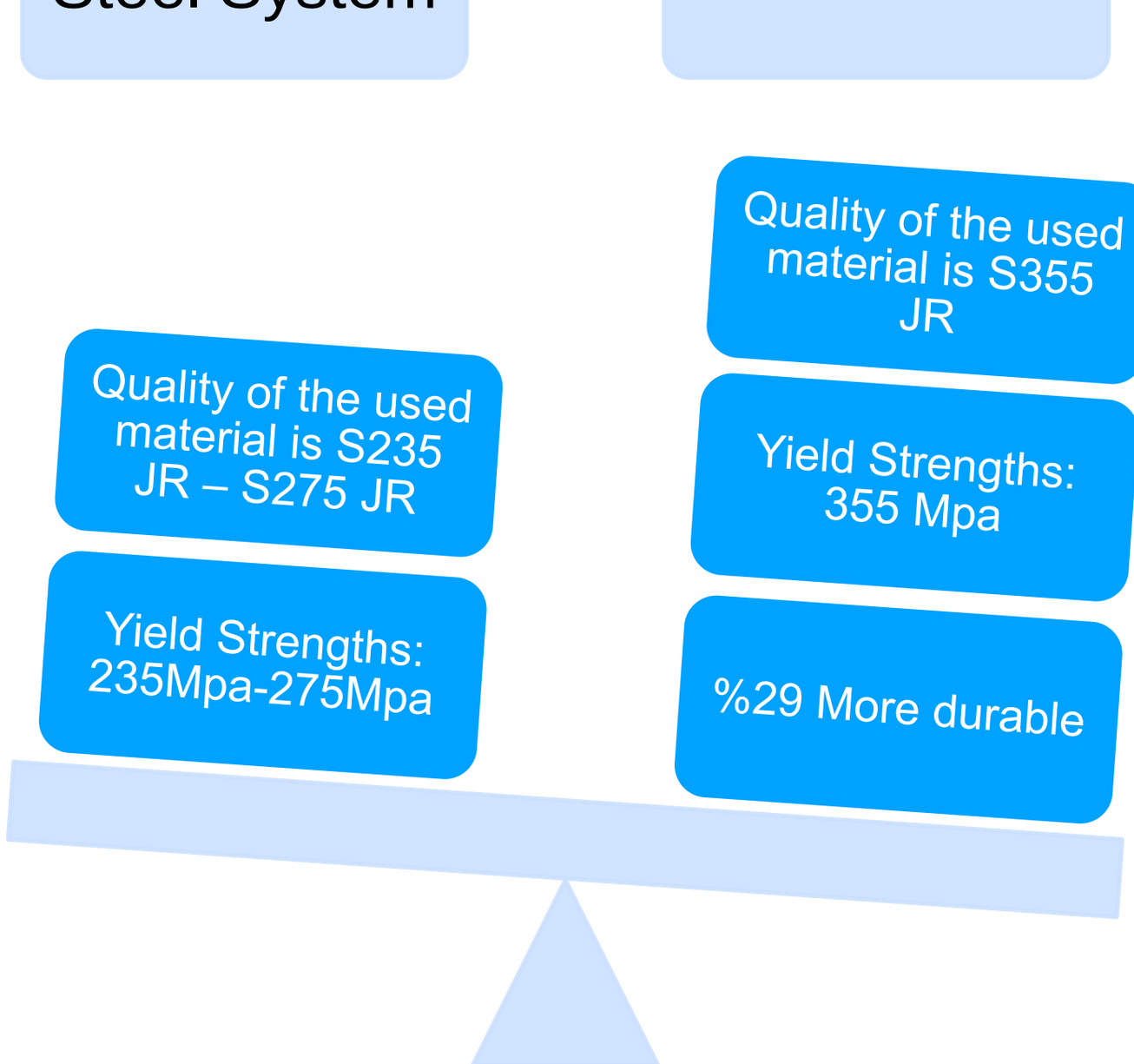
STRUCTURAL SAFETY AND COMPARISON

Conventional Steel System	PEB System
Quality of the used material is S235 JR – S275 JR	Quality of the used material is S355 JR
Yield Strengths: 235Mpa-275Mpa	Yield Strengths: 355 Mpa
	%29 More durable



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STRUCTURAL SAFETY AND COMPARISON

HADDE VE SOĞUK PROFİL TAŞIMA KAPASİTELERİNE ÖRNEK

Güvenli tasarım yapıyı ağırlaştırmakla olmaz, muhendislik kurallarına uygun tasarlamakla olur.

Z KESİT

Z20 Kesit Özellikleri (ST52 Çeliği İçin Emniyet Gerilmesi: 2,16 t/ cm²'dir.

Wx=47,55 cm³

G=5,90 kg/m

Mmax=σem x Wx= (2,16 t/cm²)x(47,55 cm³)=102,71 tcm

UPE140
ST37 çeliği için emniyet gerilmesi 1,44 t/cm²'dir.

Wx=85,64 cm³

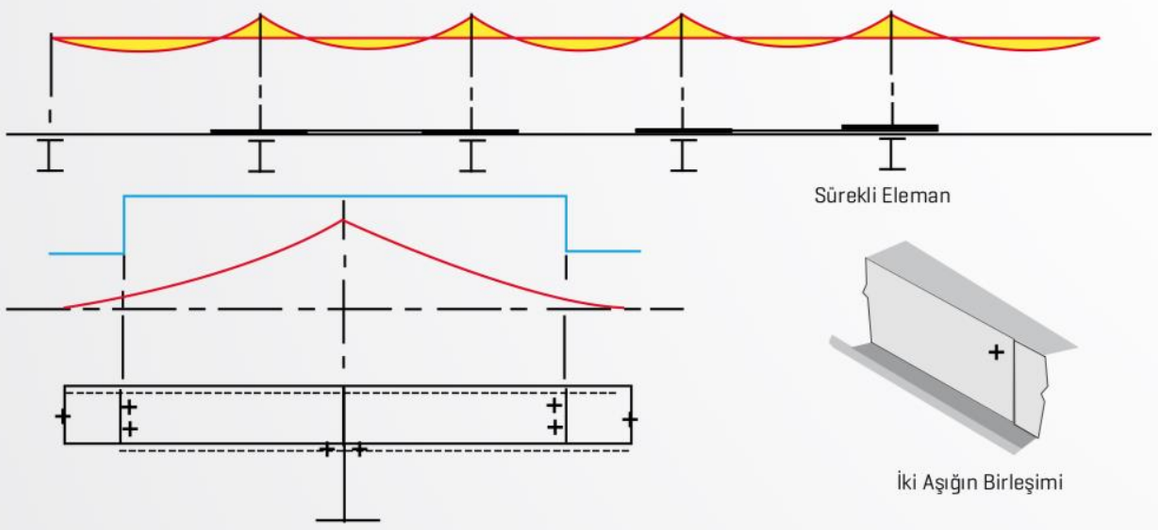
G=14,5 kg/m

Mmax= σem x Wx= (1,44 t/cm²)x(85,64 cm³)=123,3 tcm

100tcm bir momenti taşımak için kullanılan hadde ve soğuk form profil arasındaki ağırlık farkları

UPE 140 =14.5 kg/ Z20=5.90 kg aradaki fark=2.46 kat

Örnek 2



Sürekli Eleman

İki Aşığın Birleşimi

Birleşen Noktalarda Artan Mukavemet Kapasitesi

Şekilde görüldüğü gibi Z profiller çerçeve üzerine ek gelen yerlerde birbiri içine sokulup bulon vasıtası ile birleştirilmekte ve çerçeveye klipleri ile sabitlenmektedir. Ayrıca flanş destekleri kullanılarak mesnet daha da rijitleştirilip, mesnetlerin moment alması ve süreklilik sağlanmakta, en elverişsiz olan orta bölgedeki moment değerleri daha makul sınırlara inmektedir.

Conventional Steel System

PEB System

Tolerance is only increased in necessary point because only two elements are used in design connection point.

The design is made in accordance to used material because support area continuity is provided by fasteners in Secondary Steel (Purlin-Girt).

In total, %40 lesser material is used.

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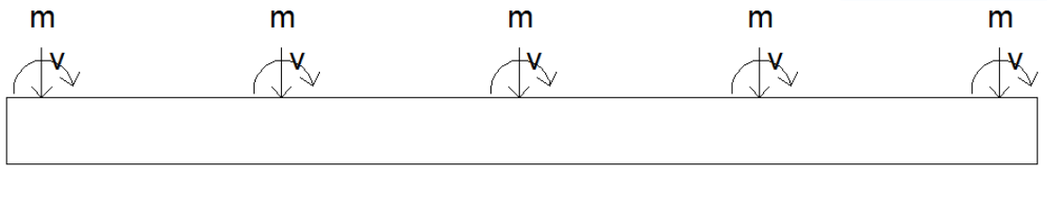
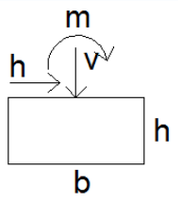
STRUCTURAL SAFETY AND COMPARISON

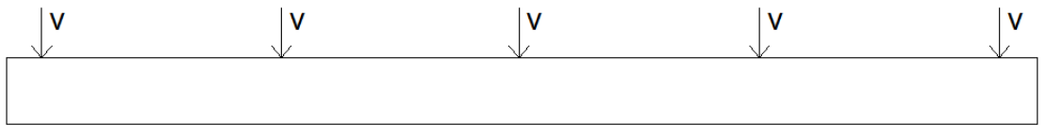
Conventional Steel System

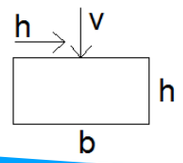
PEB System





KONVANSİYONEL



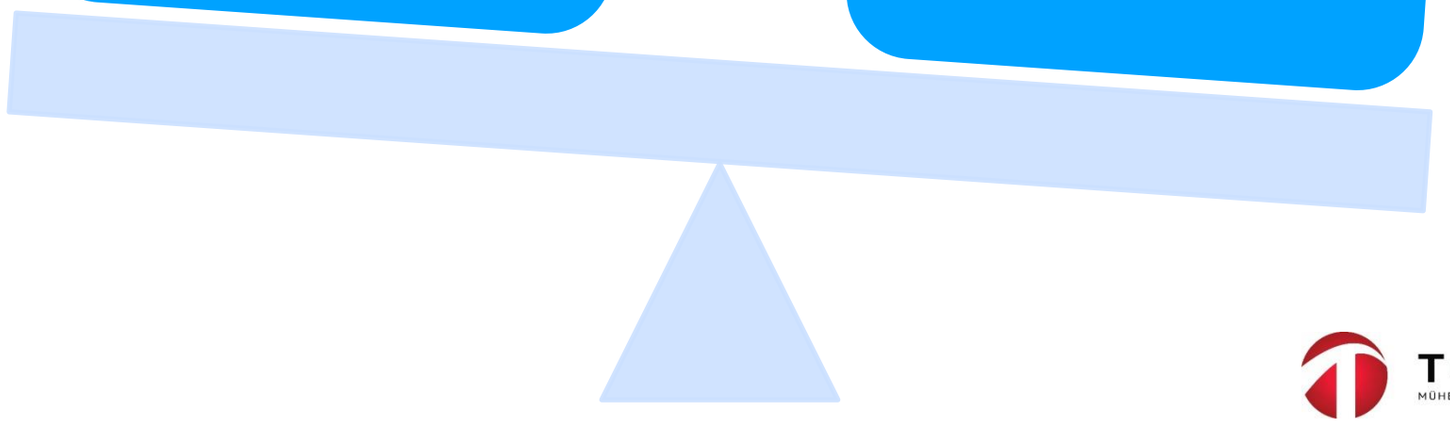


PEB

Rotation effects are not taken into consideration as the base connection points are hinged. Much more economic base dimension lead to the solution.

Base dimensions are designed larger because rotation effects in base design are taken into considerations.

An base dimensions, in dig amount, it provides up to %50 savings to the ratio of soil tension.



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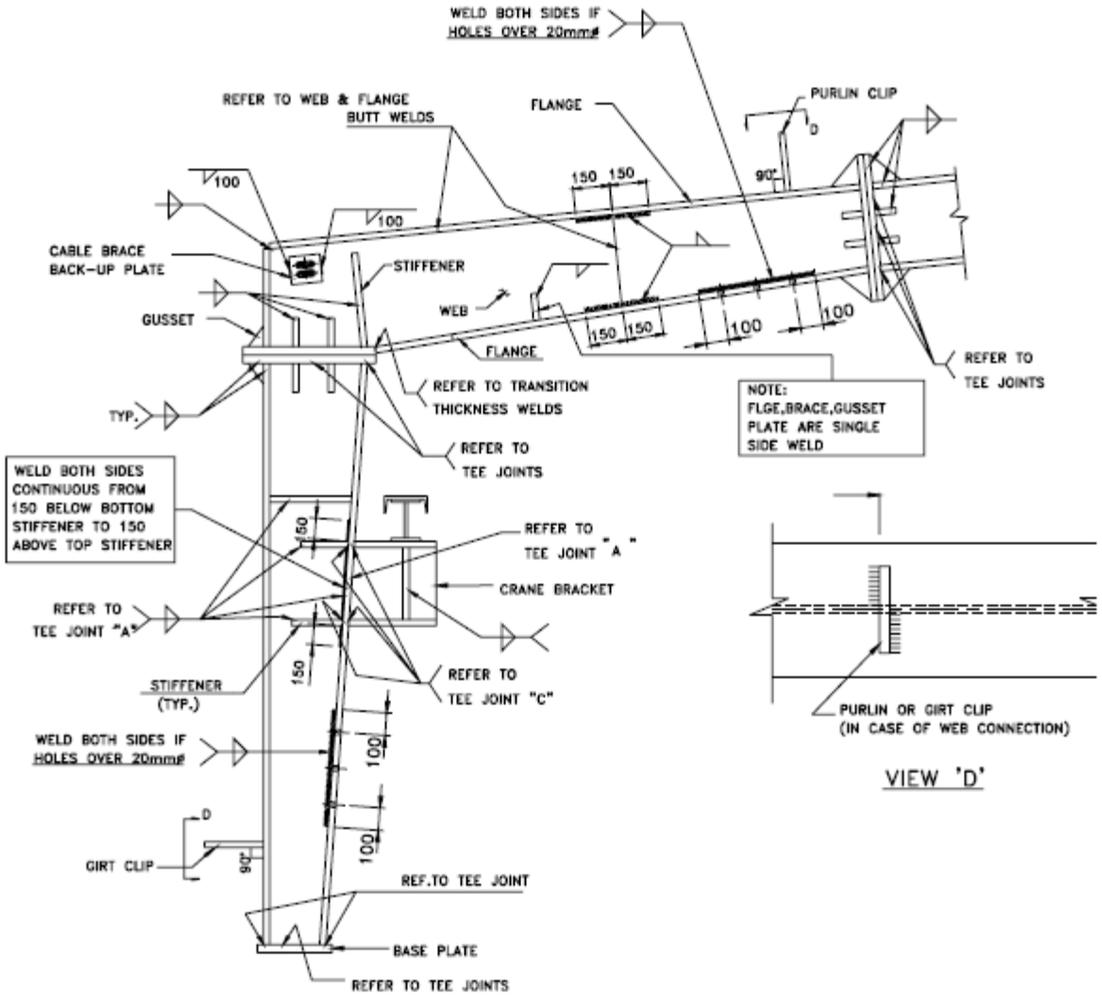
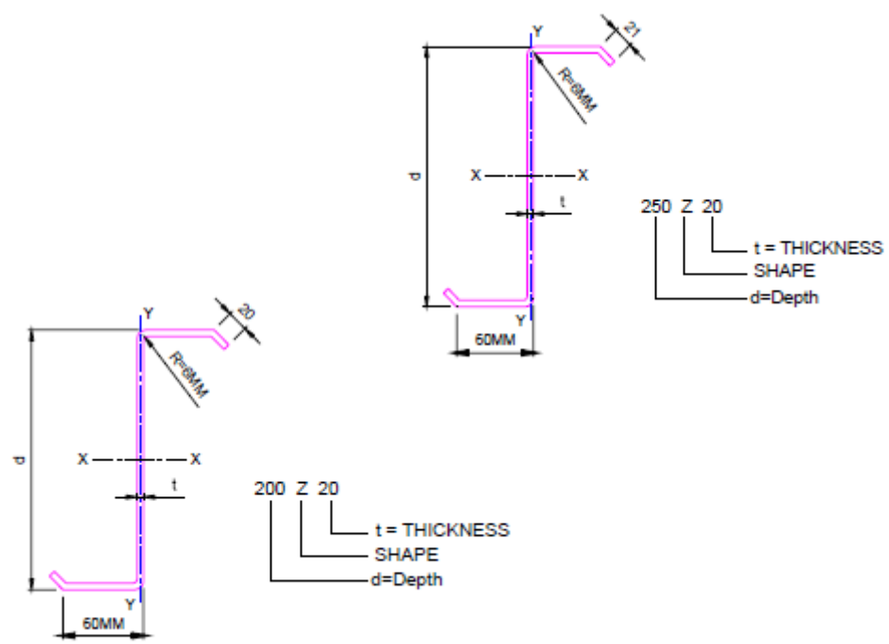
MAIN COMPONENTS OF THE PEB SYSTEM





PRIMARY STEEL (BUILT UP SECTIONS)

THE WHOLE STEEL FRAME SYSTEM IS FORMED BY VARIABLE AND PSEUDO SECTION MATERIALS.

MAIN SYSTEM MATERIAL QUALITY IS S355JR (ST.52) STEEL. AS A RESULT OF QUALITY MATERIAL, TOTAL OF %50 WEIGHT REDUCTION IS GAINED AS IN ENDURANCE AND IN MATERIAL QUANTITY. AS A RESULT OF QUALITY MATERIAL, TOTAL OF %50 WEIGHT REDUCTION IS GAINED AS IN ENDURANCE AND IN MATERIAL QUANTITY..

SECONDARY STEEL (SECONDARY MEMBERS

COLD-DORMED MATERIALS ARE USED FOR THE PURLIN AND GIRT ELEMENTS. MATERIAL THICKNESS CHANGES IN BETWEEN 2mm and 4MM. THE HEIGHTS OF PURLIN AND GIRT ELEMENTS VARY AS 200mm and 300mm. %32 WEIGHT REDUCTION IS GAINED AS THE SECONDARY MEMBERS ARE COLD-FORMED.

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DESIGN CODES AND STANDARDS

Design Codes

- TDY Türk Deprem Yönetmeliği – T.C. Çevre ve Şehircilik Bakanlığı
- MSC Manual of Steel Cons. - American Institute of Steel Construction, Inc. **(AISC)**
- CFSD Cold Formed Steel Design Manual - American Iron and Steel Institute **(AISI)**
- AWCSM American Welding Code Steel Manual – American Welding Society **(AWS)**

Standards

- UBC Uniform Building Code - International Building Code, Inc. **(IBC)**
- MBSM Metal Building Systems Manual – Metal Building Manufacturers Association, Inc. (**MBMA)**
- TS498 Yapı Elemanlarının Boyut. Alınacak Yüklerin Hesap Değ. – Türk Standartları Enstitüsü **(TSE)**
- TS648 Çelik Yapıların Hesap ve Yapım Kuralları - Türk Standartları Enstitüsü **(TSE)**

IBC 2009

AWS 2008

AISC 2005

MBMA 2010

AISI 2007

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BRAND AND QUALITY SERTIFICATES

Certificate of Registration

JAS-ANZ

KALİTE YÖNETİM SİSTEMİ

TOLAY MÜHENDİSLİK YAPI ENDÜSTRİSİ VE
İNŞAAT SANAYİ TİCARET LİMİTED ŞİRKETİ

Nispetiye Cad. Belediye Sitesi Menekşe Blok D:6 Beşiktaş/ İstanbul/ Türkiye

Kapsam:

İnşaat Mühendisliği, Mimarlık, Proje Ve Müşavirlik Hizmetleri, Altyapı Ve Üstyapı İnşaat Taahhüt Hizmetleri

Yukarda belirtilmiş olan kuruluş aşağıdaki standardın gerekliliklerini karşılamıştır.

ISO 9001:2008

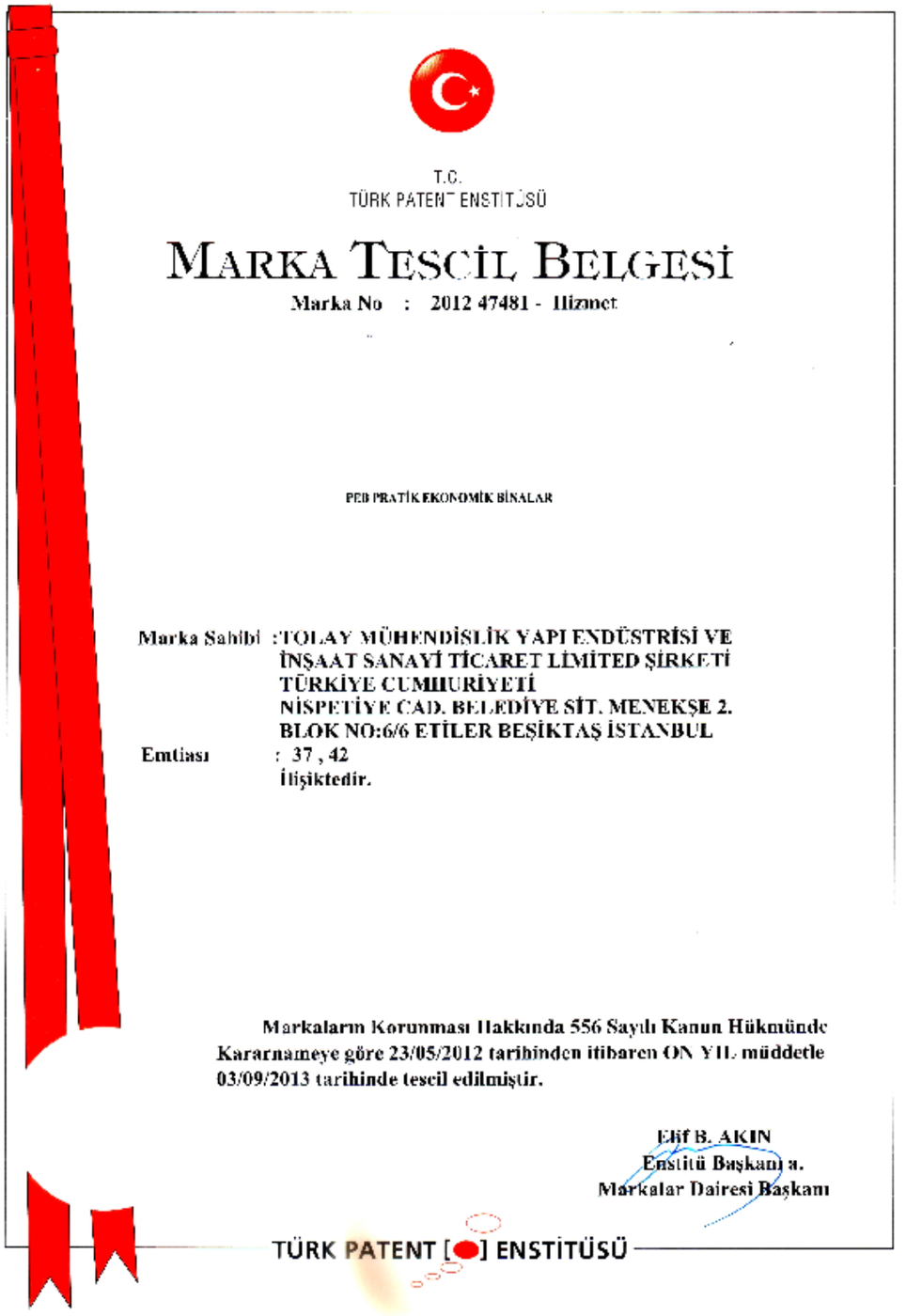
TQM : 1438 — Sertifika Numarası	26 Mart 2010 — İlk Belgelendirme Kayıt Tarihi
28 Mart 2011 — Yayın Tarihi	25 Mart 2013 — Geçerlilik Süresi Bitimi

GNS CERTIFICATION

Global Network System Co., Ltd.

#712 Hyundai Principal, 628-13 Deungchon-dong, Gangseo-gu, Seoul, Korea
www.gns-iso.co.kr

Accreditation by the Joint Accreditation System of Australia and New Zealand
www.jas-anz.org.au/register



T.C.
TÜRK PATENT ENSTİTÜSÜ

MARKA TESCİL BELGESİ

Marka No : 2012 47481 - Hizmet

PEB PRATİK EKONOMİK BİNALAR

Marka Sahibi :TOLAY MÜHENDİSLİK YAPI ENDÜSTRİSİ VE İNŞAAT SANAYİ TİCARET LİMİTED ŞİRKETİ TÜRKİYE CUMHURİYETİ NİSPETİYE CAD. BELEDİYE SİT. MENEKŞE 2. BLOK NO:6/6 ETİLER BEŞİKTAŞ İSTANBUL

Emtiası : 37 , 42

İlişiktedir.

Markaların Korunması Hakkında 556 Sayılı Kanun Hükmünde Kararnameye göre 23/05/2012 tarihinden itibaren ON YIL müddetle 03/09/2013 tarihinde tescil edilmiştir.

Elif B. AKIN
Enstitü Başkanı a.
Markalar Dairesi Başkanı

TÜRK PATENT [●] ENSTİTÜSÜ

FİRMAMIZ PEB (PRATİK EKONOMİK BİNALAR) ADINDA 2013 YILINDA SİSTEM İLE İLGİLİ PATENT ALMIŞTIR.

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PROJECT REFERENCES

PINALDI

ŞANLIURFA
TÜRKİYE

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MÜHENDİSLİK VE İNŞAAT

PROJECT REFERENCES

GIAD LLC

HARTUM
SUDAN

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PROJECT REFERENCES

NCF LLC

SALALAH
UMMAN

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PROJECT REFERENCES

OLAM LLC

AKRA

GANA

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MÜHENDİSLİK VE İNŞAAT

PROJECT REFERENCES

TAVANBOGD

DARKHAN
MOĞOLİSTAN

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PROJECT REFERENCES

UFRA

TÜRKMENBAŞI
TÜRKMENİSTAN

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PROJECT REFERENCES

AVCI TEK.

ADIYAMAN
TÜRKİYE

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MÜHENDİSLİK VE İNŞAAT

PROJECT REFERENCES

TAVANNUUR

DARKHAN
MOĞOLİSTAN

TOLAY
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PROJECT REFERENCES

FAYCIM

TURKMENBAŞI
TÜRKMENİSTAN

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EXAMPLES OF LOADING AND ASSEMBLY

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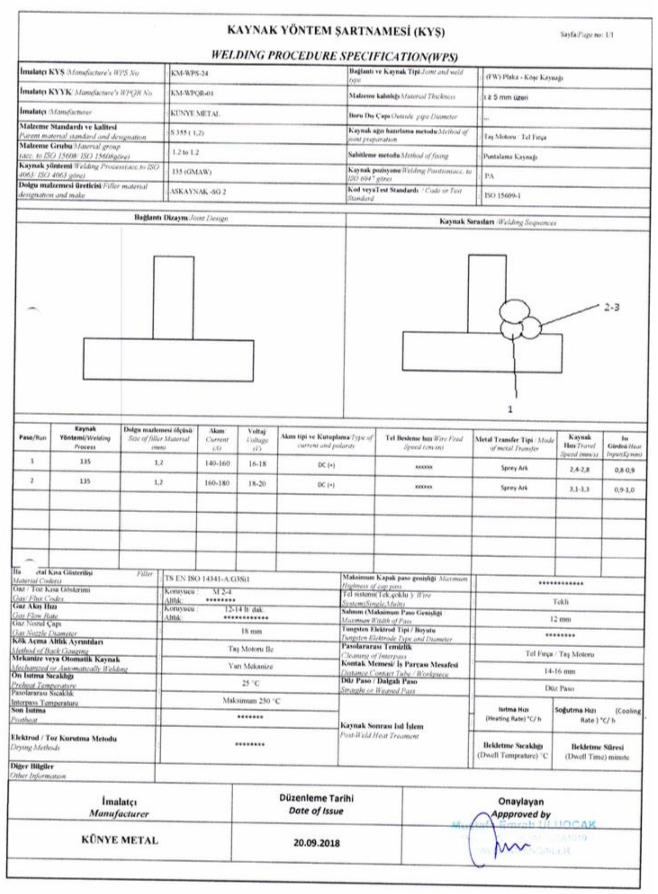
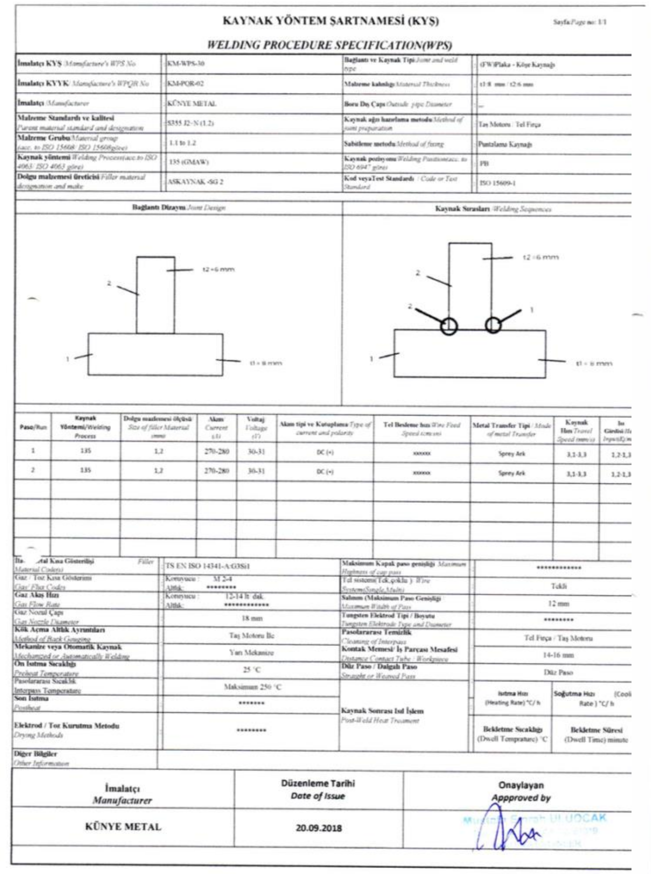
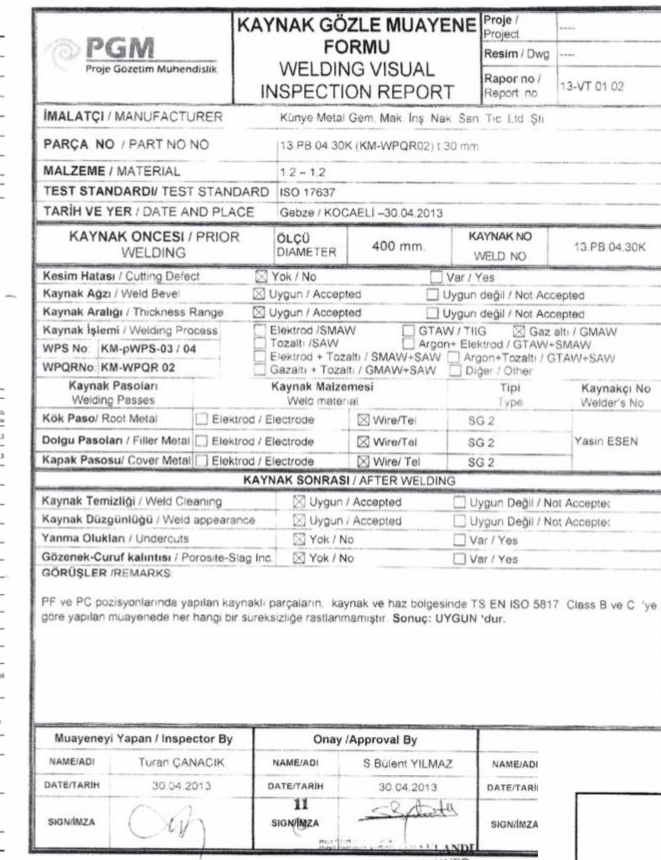
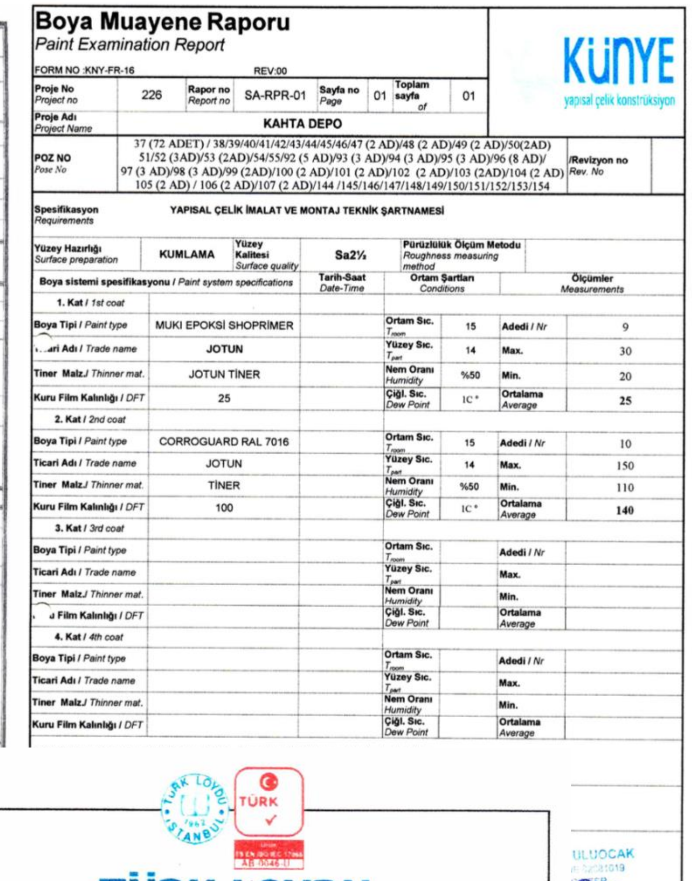
QUALITY CONTROL










TÜRK LOYDU

BELGE

CERTIFICATE

Belge No / Certificate No : 07746-18
TL No: 10396

Türk Loydu hereby certifies that,

KÜNYE METAL GEMİCİLİK MAKİNA İNŞAAT NAKLİYE SAN. TİC. LTD. ŞTİ.
Şeker Pınar Mah. Beste Sk. No:16 Çayırova KOCAELİ

firmasında Türk Loydu tarafından gerçekleştirilen denetim sonucunda

ISO 3834-2:2005

kaynak için kalite şartlarını sağlayan kalite sisteminin tarif edilen geçerlilik alanı* için
has implemented and operates a quality system satisfying the quality requirements for welding for the defined scope of activity*

ilgili standart gereklerine uygun olarak kurulmuş ve işletilmekte olduğu belgelenmiştir.
in compliance with the requirements of the quality standard mentioned above by an audit performed by Türk Loydu.

Bu belge hakkında her türlü bilgiyi + 90 216 581 37 00 no.lu telefondan teyit edebilirsiniz
All kind of information about this certificate can be confirmed from the phone no. +90 216 581 37 00

Belgelendirme tarihi/Date of certification : 19.11.2018
Belge geçerlilik tarihi/Date of certificate expiry : 18.11.2021

Hasan MÜFTÜOĞLU
Ürün Belgelendirme Komitesi Başkanı
Head of Product Certification Committee

Murat DEVREZ
Teknik Yönetici
Technical Manager

* Arka sayfaya bakınız.
See back page

The entire production stage is controlled and reported by 3rd Party Companies (Türk Loydu - PGM - TUV SUD).

Materials Certificates - Malzeme Sertifikaları - Mill's Certificate
Materials Act of Acceptance Reports - Malzeme Giriş ve Kontrol Raporları
CE Label - CE Etiketi
WPS - Welding Procedure Specifications - Kaynak Prosedür Şartnamesi
WPQR - Welding Procedure Qualification Record - Kaynak Yöntem Testi Onay Raporu
Welder Certificates - Kaynakçı Sertifikaları
Welding Visual Inspection Report - Kaynak Gözlemsel Muayene Raporu
NDT (Non-Desctruction Test) - Hasarsız Muayene Raporları
Paint Examination Report - Boya Muayene Raporu
Calibration Reports - Kalibrasyon Raporları

THANK YOU

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